CHECKLIST ENVIRONMENTAL ASSESSMENT

Project Name:	**Helmville South**
Proposed Implementation Date:	**June 2014**
Proponent:	**Montana Department of Natural Resources and Conservation**
Location:	**12 air miles northeast of Drummond, MT**
County:	**Powell County**

I. TYPE AND PURPOSE OF ACTION

The Montana Department of Natural Resources and Conservation's Anaconda Unit is proposing to harvest approximately 1.8 MMBF (million board feet) of timber from approximately 280 acres on Common School Trust Lands within T12N, R11W, Section 16, southwest of Helmville, MT.

Objectives of this proposal are:

- Generate revenue for the Common School Trust Fund
- Increase overall forest health by returning stocking levels to a more natural condition
- Promote long-term revenue generating capability through regeneration and biodiversity

The lands involved in this proposed project are held by the State of Montana in trust for the specific trusts documented above. (Enabling Act of February 22, 1889; 1972 Montana Constitution, Article X, Section 11). The Board of Land Commissioners and the DNRC are required by law to administer these trust lands to produce the largest measure of reasonable and legitimate return over the long run for the beneficiary institutions (Section 77-1-202, MCA). The DNRC would manage lands involved in this project in accordance with the State Forest Land Management Plan (DNRC 1996) and the Administrative Rules for Forest Management (ARM 36.11.401 through 450), DNRC Habitat Conservation Plan as well as other applicable state and federal laws.

II. PROJECT DEVELOPMENT

1. PUBLIC INVOLVEMENT, AGENCIES, GROUPS OR INDIVIDUALS CONTACTED:

Provide a brief chronology of the scoping and ongoing involvement for this project. List number of individuals contacted, number of responses received, and newspapers in which notices were placed and for how long. Briefly summarize issues received from the public.

Scoping notices were sent to adjacent landowners and those individuals/groups on the Statewide MEPA scoping list.

External comments were received from:

- Lessee and adjacent landowner, Doug Rohrer. Primarily concerned with noxious weeds.
- Mineral County Commissioners. General support
- Montana Fish Wildlife and Parks. Potential impacts to fisheries and wildlife.

Hydrological, soils, wildlife, archaeological, and vegetative concerns were identified by DNRC specialists and field foresters for both the No-Action and the Action Alternatives. Issues and concerns have been resolved or mitigated through project design and/or would be included as specific contractual requirements of the project.

2. OTHER GOVERNMENTAL AGENCIES WITH JURISDICTION, LIST OF PERMITS NEEDED:

Examples: cost-share agreement with U.S. Forest Service, 124 Permit, 3A Authorization, Air Quality Major Open Burning Permit.

Montana Department of Environmental Quality (DEQ)
DNRC, classified as a major open burner by DEQ, is issued a permit from DEQ to conduct burning activities on state lands managed by DNRC. As a major open-burning permit holder, DNRC agrees to comply with the limitations and conditions of the permit.

Montana/Idaho Airshed Group
DNRC is a member of the Montana/Idaho Airshed Group, which regulates prescribed burning, including both slash and broadcast burning related to forest-management activities performed by DNRC. As a member of the Airshed Group, DNRC agrees to only burn on days approved for good smoke dispersion as determined by the Smoke Management Unit in Missoula, Montana.

United States Fish and Wildlife Service (USFWS)
In December 2011, the U.S. Fish and Wildlife Service issued an Incidental Take Permit under Section 10 of the Endangered Species Act. The Permit applies to select forest management activities affecting the habitat of grizzly bear, Canada lynx, and three fish species — bull trout, westslope cutthroat trout, and Columbia redband trout — on project area lands covered under the HCP. DNRC and the USFWS will coordinate monitoring of certain aspects of the conservation commitments to ensure program compliance with the HCP.

---

3. ALTERNATIVE DEVELOPMENT:
Describe alternatives considered and, if applicable, provide brief description of how the alternatives were developed. List alternatives that were considered but eliminated from further analysis and why.

Alternative A – No Action
This alternative would not harvest any timber from Common School Trust Lands. No new roads would be built. DNRC approved practices, such as the existing forest grazing license would remain unchanged.

Alternative B – Action
The action alternative is a combination of salvage harvest of dead, dying and high-risk trees to reduce competition, promote regeneration of diverse conifer species and improve tree growth. Approximately 280 acres would be harvested using a combination of 80 acres cable logging and 200 acres ground based skidding. Selective harvest may occur in segments of the RMZ within a band of 50 to 80 feet from South Cottonwood Creek. The RMZ harvest may occur on segments of up to total 800 feet in length (up to 1/2 acre area) and at least 50% of trees would be retained. Approximately 2 miles of new permanent, closed road, and 1 ¼ miles of temporary road would be constructed for this project. Approximately 6 miles of existing roads would be maintained and improved to meet BMP's and control sedimentation for the period of DNRC operations. All new permanent roads would be closed to unauthorized vehicles and temporary roads would be reclaimed.

Silvicultural treatments would be seed tree and shelterwood harvests designed to promote regeneration and improve overall forest health. Regeneration would be accomplished through a mix of natural regeneration and inter-planting. Prescribed burning may be utilized as necessary.

III. IMPACTS ON THE PHYSICAL ENVIRONMENT

- *RESOURCES potentially impacted are listed on the form, followed by common issues that would be considered.*
- *Explain POTENTIAL IMPACTS AND MITIGATIONS following each resource heading.*
- *Enter "NONE" If no impacts are identified or the resource is not present.*

---

4. GEOLOGY AND SOIL QUALITY, STABILITY AND MOISTURE:
Consider the presence of fragile, compactable or unstable soils. Identify unusual geologic features. Specify any special reclamation considerations. Identify direct, indirect, and cumulative effects to soils.

DNRC Hydrologist/Soil Scientist, Jeff Collins completed a detailed soils analysis for the proposed project. This project assessment considered the proposed harvest areas and materials on access routes.

Soils are complexes of shallow to moderately deep residual soils on upper slopes and midslopes that include Yreka, Bignell and Winkler. Midslopes and toeslopes include complexes of Yreka, Bignell and Crow soils that have higher clay content subsoils. Geology is mainly argillites and quartzites with clay rich tertiary age sediments on lower slopes.

A minor area (<4 acres) of marginal slope stability is located within harvest units in the NE corner of the project that are not near surface waters and do not have erosion or off-site sediment delivery.

Alternative A – No Action
Implementation of the no-action alternative would result in no soil resource impacts in the project area. Soil resource conditions would remain similar to those described in the existing conditions of this analysis. Geology effects of small areas of shallow slumps are expected to continue to occur associated with tree windthrow or earthquake and the areas affected are generally less than ½ acre and combined up to 4 acres. The timing cannot be predicted.

Alternative B – Action
The proposed actions would have low to moderate risk of direct and indirect impacts based on implementing BMP's, the combined mitigation measures and soil monitoring on comparable sites. Mitigations include slope limitations of 45% or less for ground based equipment, cable harvest on steeper slopes, retaining a portion of woody debris and at least 25% of slash, well distributed for soil productivity, and prompt grass seeding of roads as needed to minimize erosion and protect soil resources. Operations would be limited to dry, frozen or snow covered conditions to minimize soil impacts on moderate slopes. The minor area of marginal slope stability would be avoided by roads and protected with site specific mitigations and conditions would not be aggravated by the selective harvest. There is low risk of cumulative soil impacts considering no previous harvest except for minor post cutting and implementing the project mitigations. The proposed harvest would have successful forest regeneration and improved growth of retained trees with diverse species and reduced competition for soils resources.

For more detailed information, see attachment C-1, Soils Analysis

---

5. WATER QUALITY, QUANTITY AND DISTRIBUTION:
Identify important surface or groundwater resources. Consider the potential for violation of ambient water quality standards, drinking water maximum contaminant levels, or degradation of water quality. Identify direct, indirect, and cumulative effects to water resources.

DNRC Hydrologist, Jeff Collins completed a watershed analysis for the project area. Timber harvest would occur on approximately 280 acres. The proposed harvest would use existing haul roads, and construct approximately 3.25 miles of new and temporary roads on dry sites with no new stream crossings. The main access road is in good condition and portions are graveled. Existing roads would have adequate drainage installed and maintained.

Selective harvest may occur in segments of the RMZ within a band of 50 to 80 feet from South Cottonwood Creek. The RMZ harvest may occur on segments of up to total 800 feet in length (up to 1/2 acre area) and at least 50% of trees would be retained.

Alternative A – No Action
No change to existing conditions would be expected under the no action alternative. Existing roads would not receive maintenance to improve drainage.

Alternative B – Action
The proposed logging operations and road construction are expected to have low risk of direct, in-direct or cumulative impacts to water quality from sedimentation, and implementing BMP's, and Forest Management Rules. A complete water quality report is included in the project file.

For more detailed information, see attachment C, Hydrolgy/Fisheries report.

6. AIR QUALITY:

What pollutants or particulate would be produced (i.e. particulate matter from road use or harvesting, slash pile burning, prescribed burning, etc)? Identify the Airshed and Impact Zone (if any) according to the Montana/Idaho Airshed Group. Identify direct, indirect, and cumulative effects to air quality.

Alternative A – No Action

Without any harvesting to generate residual slash concentrations or piles, no burning would occur. Negative impacts to air quality are not anticipated under this alternative.

Alternative B – Action

Under the Action Alternative, slash piles consisting of tree limbs and tops and other vegetative debris would be created throughout the project area during harvesting. These slash piles would ultimately be burned after harvesting operations have been completed. Burning within the project area would be short in duration and would be conducted when conditions favor good to excellent ventilation and smoke dispersion as determined by the Montana Department of Environmental Quality and the Montana/Idaho Airshed Group. The DNRC, as a member of the Montana/Idaho Airshed Group, would burn only on approved days. Thus, direct and indirect effects to air quality due to slash pile burning associated with the proposed action would be minimal.

Burning that may occur on adjacent properties in combination with the proposed action could potentially increase cumulative effects to the local airshed and the Class I Areas. The United States Forest Service and large scale industrial forestry operations in the area participate as airshed cooperators and operate under the same Airshed Group guidelines as the DNRC. Non-industrial timberland operators are regulated by the Montana Department of Environmental Quality and burning is only allowed during seasons that provide good ventilation and smoke dispersion. Thus, cumulative effects to air quality due to slash pile burning associated with the proposed action would also be expected to be minimal.

Harvesting and log hauling could create dust which may affect local air quality. Harvesting operations would be short in duration and could occur during the winter months that would minimize dust dispersal. Thus, direct, indirect, and cumulative effects to air quality due to harvesting and hauling associated with the proposed action would be minimal.

7. VEGETATION COVER, QUANTITY AND QUALITY:

What changes would the action cause to vegetative communities? Consider rare plants or cover types that would be affected. Identify direct, indirect, and cumulative effects to vegetation.

No rare plants or cover types have been identified. Current Stand Level Inventory identifies 118 acres as potential old growth. Field inspections show the identified stands do not meet the department's old growth criteria due to lack of large (> 21" DBH) trees present.

The following is a description of existing forest conditions within each proposed harvest unit.

Unit Number (s):	**1,2, 4 and 8.**
Acres:	**121 total**
Elevation:	**5000 – 5200**
Slope:	**0% - 50%**
Aspect(s):	**Unit 1 – N ; Units 2 and 4 – E/NE aspect**
Habitat type:	**PSME/CARU; PSME/SYAL**

- The stands are predominantly single storied and even aged, though there are a few pockets of larger trees that survived the previous disturbance. Tree ages range from 90 – 125 with the younger trees mostly being found lower on the slope, closer to the grassland. There is a fair amount of variance between tree size which is mostly due to growing space. In general the trees have decent form and vigor. Radial growth rates show the trees declining in growth.
- Minor amounts of root rot and western spruce budworm is present.

- Stand composition: Nearly 100% Douglas-fir.
- Structure and densities (averages): BA - 180 sq. ft (>5" DBH); TPA – 320; QDBH – 10.6.
- Non-lethal, low intensity fires are likely the predominant fire regime.
- Almost no advanced regeneration is present.

Unit Number (s): **3,6 and 7.**
Acres: **132 total**
Elevation: **5200 – 5600**
Slope: **10% - 70%**
Aspect(s): **NE aspect**
Habitat type: **PSME/SYAL; PSME/SYAL**

- The stands are un-even aged and multi-storied. Merchantable tree ages range from 90 – 250+. These stands appear to be poor in vigor which is likely due to the shallow soils.
- Stand composition: Nearly 100% Douglas-fir.
- Minor amounts of root rot and western spruce budworm is present.
- Structure and densities (averages): BA - 140 sq. ft (> 5" DBH); TPA – 225; QDBH – 10.6.
- Low to moderate intensity fire is likely the predominant fire regime.
- Very little advanced regeneration is present and what is present has been heavily impacted by western spruce budworm and generally has poor form and vigor.

Unit Number: **5**
Acres: **26**
Elevation: **5400**
Slope: **50-60%**
Aspect(s): N
Habitat type: **PSME/CARU;**

- The stand is single storied and even aged consisting of primarily LP pole timber with scattered small sawlogs. Tree ages range from 90 – 125 with the younger trees mostly being found lower on the slope. Nearly all of the LP >6" DBH have been killed by Mountain Pine Beetle.
- Stand composition: 95% Lodgepole pine; 5% Douglas-fir.
- Pre-cruise structure and densities (averages): BA - 140 sq. ft; TPA – 340; QDBH – 7.5"
- Stand replacement fire is likely the fire regime.
- Very little advanced regeneration is present.

Weeds
Spotted knapweed and Houndstongue occur in this area across ownerships and due in part to spread by wind and animals.

Alternative A – No action
No harvest would occur and no immediate changes would be anticipated to current conditions. The stands would continue to decline in health and vigor over time until a natural event occurred to initiate a change in stand conditions. Western spruce budworm and root rot would continue to add to the declining health.

Noxious weeds would still continue to spread by wind and animals, including livestock.

Alternative B – Action
Forest patch size and shape would not be affected though densities within each patch would be reduced to varying extents. Basal areas would be reduced to approximately 20-40 square feet and emphasis would be placed on leaving the best trees (both pheno-typical and geno-typical). Natural regeneration would be expected, based on adjacent areas where previous harvesting has occurred. Portions of the harvest area would be inter-

planted with western larch to provide diversity. No direct, indirect or cumulative effects would be anticipated with the action alternative.

To prevent introduction of new weeds, off-road equipment will be cleaned prior to entry into harvest areas. Newly disturbed roads and landings will be seeded to noxious weed free, site adapted grasses to stabilize soils and reduce the spread of weeds. Existing weeds along roadsides in the section may be treated, based on funding and priority, prior to harvest. Weeds off-road would not be treated. Existing weeds would be expected to have a low to moderate increase. More weed control would occur compared to the no-action alternative and grass and competitive vegetation would increase along roads.

Overall cumulative effects of increased noxious weeds within the project area are expected to be moderate, based on herbicide treatments of existing weeds along roads and implementing prevention measures to reduce new weeds, by cleaning equipment and planting grass on roads to compete against weeds.

---

8. TERRESTRIAL, AVIAN AND AQUATIC LIFE AND HABITATS:
Consider substantial habitat values and use of the area by wildlife, birds or fish. Identify direct, indirect, and cumulative effects to fish and wildlife.

DNRC Wildlife Biologist, Garrett Schairer completed a wildlife analysis for the proposed project. The following species were considered: Grizzly bear; Canada lynx; Bald eagle; Black-backed woodpecker; Coeur d'Alene salamander; Columbian sharp-tailed grouse; Common loon; Fisher; Gray wolf; Harlequin duck; Mountain plover; Northern bog lemming; Peregrine falcon; Pileated woodpecker; Townsend's big-eared bat; Wolverine; Big Game species (Elk, Moose, Deer). A minor risk of adverse impacts were anticipated for most species with moderate risks associated with Pileated woodpecker and Big game winter range. ***For detailed information, see Attachment B – Wildlife Analysis.***

DNRC Hydrologist, Jeff Collins completed a fisheries analysis for the proposed project. Cottonwood Creek is a fisheries stream supporting westslope cutthroat trout and other minor species. Westslope cutthroat trout is a sensitive species. There are no indications that the South Fork Cottonwood Creek can support Bull trout. There is no fisheries information on fish habitat or populations available on the South Fork Cottonwood Creek (MFISH 2013). No fisheries were identified in Mud Creek, which the existing access road follows. The South Fork Cottonwood Creek drainage is approximately 3.5 miles long and there are no stream crossings on the state lands project parcel and few in the drainage.

There is one intermittent and one perennial stream crossing in the headwaters of South Fork Cottonwood Creek. The perennial crossing has low flow and unlikely to support fish. The culvert sites are sources of sediment from road drainage and grazing uses. The access road system is a private controlled access road not open to the public, and traffic use is light. Stream channel conditions along South Fork Cottonwood Creek are fair to poor, and sources of sediment from animal bank trampling and trails. There are moderate levels of timber harvest in the area, but low effects on water quality.

The proposed project has overall low potential for direct, indirect or cumulative impacts to fisheries based on the following: no harvest within the SMZ/RMZ of the South Fork Cottonwood Creek, moderate harvest away from streams, planned road repairs and maintenance to reduce sediment, planned road construction is on dry sites with no new stream crossings, implementation of BMP's, applicable rules and attached mitigations. The sediment effects of grazing on South Fork Cottonwood Creek would not be impacted by the proposed forest treatments and DNRC would continue to work with the grazing licensee on ways to reduce grazing impacts along the South Fork Cottonwood Creek and long term improvements are expected to improve slowly. ***For more detailed information, see Attachment C-1, Watershed and Fisheries Analysis.***

---

9. UNIQUE, ENDANGERED, FRAGILE OR LIMITED ENVIRONMENTAL RESOURCES:
Consider any federally listed threatened or endangered species or habitat identified in the project area. Determine effects to wetlands. Consider Sensitive Species or Species of special concern. Identify direct, indirect, and cumulative effects to these species and their habitat.

DNRC is managing the habitats of threatened and endangered species on this project by implementing the Montana DNRC Forested Trust Lands Habitat Conservation Plan (HCP) and the associated Incidental Take Permit (Permit) that was issued by the United States Fish & Wildlife Service (USFWS) in February of 2012 under Section 10 of the Endangered Species Act. The HCP identifies specific conservation strategies for managing the habitats of grizzly bear, Canada lynx, and three fish species: bull trout, westslope cutthroat trout, and Columbia redband trout. This project complies with the HCP. The HCP can be found at www.dnrc.mt.gov/HCP.

For more information, see Attachment B – Wildlife Analysis.

---

10. HISTORICAL AND ARCHAEOLOGICAL SITES:

Identify and determine direct, indirect, and cumulative effects to historical, archaeological or paleontological resources.

In October of 2013, the DNRC staff archaeologist conducted a Class III inventory of cultural resources of the entire section. No cultural or paleontologic resources were identified. No additional archaeological investigative work is recommended in order for the proposed timber sale to proceed.

If cultural resources are discovered, the DNRC archaeologist would be notified immediately and all operations would cease until further consultation.

---

11. AESTHETICS:

Determine if the project is located on a prominent topographic feature, or may be visible from populated or scenic areas. What level of noise, light or visual change would be produced? Identify direct, indirect, and cumulative effects to aesthetics.

Alternative A – No Action

No change would be anticipated to the existing aesthetics. Mountain pine beetle has run its course, causing mortality in nearly all of the available trees. These trees have lost their red needles and now appear as grey sticks on the landscape.

Alternative B – Action

Approximately 130 acres of the proposed harvest area are visible from State Highway 271. The remaining acres are only visible from private roads. A reduction in forested cover would be visible with implementation of the action alternative.. Disturbance and slash associated with harvest activities would be noticeable for a 2 to 3 year period and soften over time.

Minimal direct, indirect or cumulative effects would be anticipated with either alternative.

---

12. DEMANDS ON ENVIRONMENTAL RESOURCES OF LAND, WATER, AIR OR ENERGY:

Determine the amount of limited resources the project would require. Identify other activities nearby that the project would affect. Identify direct, indirect, and cumulative effects to environmental resources.

No negative direct, indirect or cumulative effects are expected to occur as a result of the no action or the proposed action alternative.

---

13. OTHER ENVIRONMENTAL DOCUMENTS PERTINENT TO THE AREA:

List other studies, plans or projects on this tract. Determine cumulative impacts likely to occur as a result of current private, state or federal actions in the analysis area, and from future proposed state actions in the analysis area that are under MEPA review (scoped) or permitting review by any state agency.

None

IV. IMPACTS ON THE HUMAN POPULATION

- *RESOURCES potentially impacted are listed on the form, followed by common issues that would be considered.*
- *Explain POTENTIAL IMPACTS AND MITIGATIONS following each resource heading.*
- *Enter "NONE" If no impacts are identified or the resource is not present.*

14. HUMAN HEALTH AND SAFETY:

Identify any health and safety risks posed by the project.

No un-acceptable health and safety risks are anticipated under either alternative.

15. INDUSTRIAL, COMMERCIAL AND AGRICULTURE ACTIVITIES AND PRODUCTION:

Identify how the project would add to or alter these activities.

The state parcel is currently classified as a forested parcel and a forest grazing license is issued for 65 AUM's. Minimal change would be expected under either alternative.

16. QUANTITY AND DISTRIBUTION OF EMPLOYMENT:

Estimate the number of jobs the project would create, move or eliminate. Identify direct, indirect, and cumulative effects to the employment market.

Alternative A – No Action

No employment would be generated. The School Trusts, except for the Morill Trust , would absorb costs which have already been incurred to cover sale preparation and environmental analysis with no return.

Alternative B - Action

This project would provide employment to a logging company for approximately 3 months

17. LOCAL AND STATE TAX BASE AND TAX REVENUES:

Estimate tax revenue the project would create or eliminate. Identify direct, indirect, and cumulative effects to taxes and revenue.

Minimal increase to existing base would be anticipated with implementation of the action alternative.

18. DEMAND FOR GOVERNMENT SERVICES:

Estimate increases in traffic and changes to traffic patterns. What changes would be needed to fire protection, police, schools, etc.? Identify direct, indirect, and cumulative effects of this and other projects on government services

No impacts are anticipated under either alternative.

19. LOCALLY ADOPTED ENVIRONMENTAL PLANS AND GOALS:

List State, County, City, USFS, BLM, Tribal, and other zoning or management plans, and identify how they would affect this project.

None

20. ACCESS TO AND QUALITY OF RECREATIONAL AND WILDERNESS ACTIVITIES:

Identify any wilderness or recreational areas nearby or access routes through this tract. Determine the effects of the project on recreational potential within the tract. Identify direct, indirect, and cumulative effects to recreational and wilderness activities.

This State parcel is surrounded by private land and is only accessible through private land. No wilderness or recreational areas are nearby. No un-acceptable impacts are anticipated with either alternative.

21. DENSITY AND DISTRIBUTION OF POPULATION AND HOUSING:
Estimate population changes and additional housing the project would require. Identify direct, indirect, and cumulative effects to population and housing.

No change would be anticipated with either alternative.

22. SOCIAL STRUCTURES AND MORES:
Identify potential disruption of native or traditional lifestyles or communities.

No change would be anticipated with either alternative.

23. CULTURAL UNIQUENESS AND DIVERSITY:
How would the action affect any unique quality of the area?

No change would be anticipated with either alternative.

24. OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES:
Estimate the return to the trust. Include appropriate economic analysis. Identify potential future uses for the analysis area other than existing management. Identify direct, indirect, and cumulative economic and social effects likely to occur as a result of the proposed action.

Alternative A – No Action
No revenue would be generated and returned to the Common School Trust Fund. A grazing license would remain in place providing approximately $600 per year to the Common School Trust Fund.

Alternative B - Action
Under the action alternative, this project is expected to return approximately $225,000 to the common school trust fund in addition to the associated grazing fees.

EA Checklist Prepared By:	**Name:**	Brian Robbins	**Date:**	3/31/2014
	Title:	Forester		

V. FINDING

25. ALTERNATIVE SELECTED:

The Action Alternative is the selected alternative.

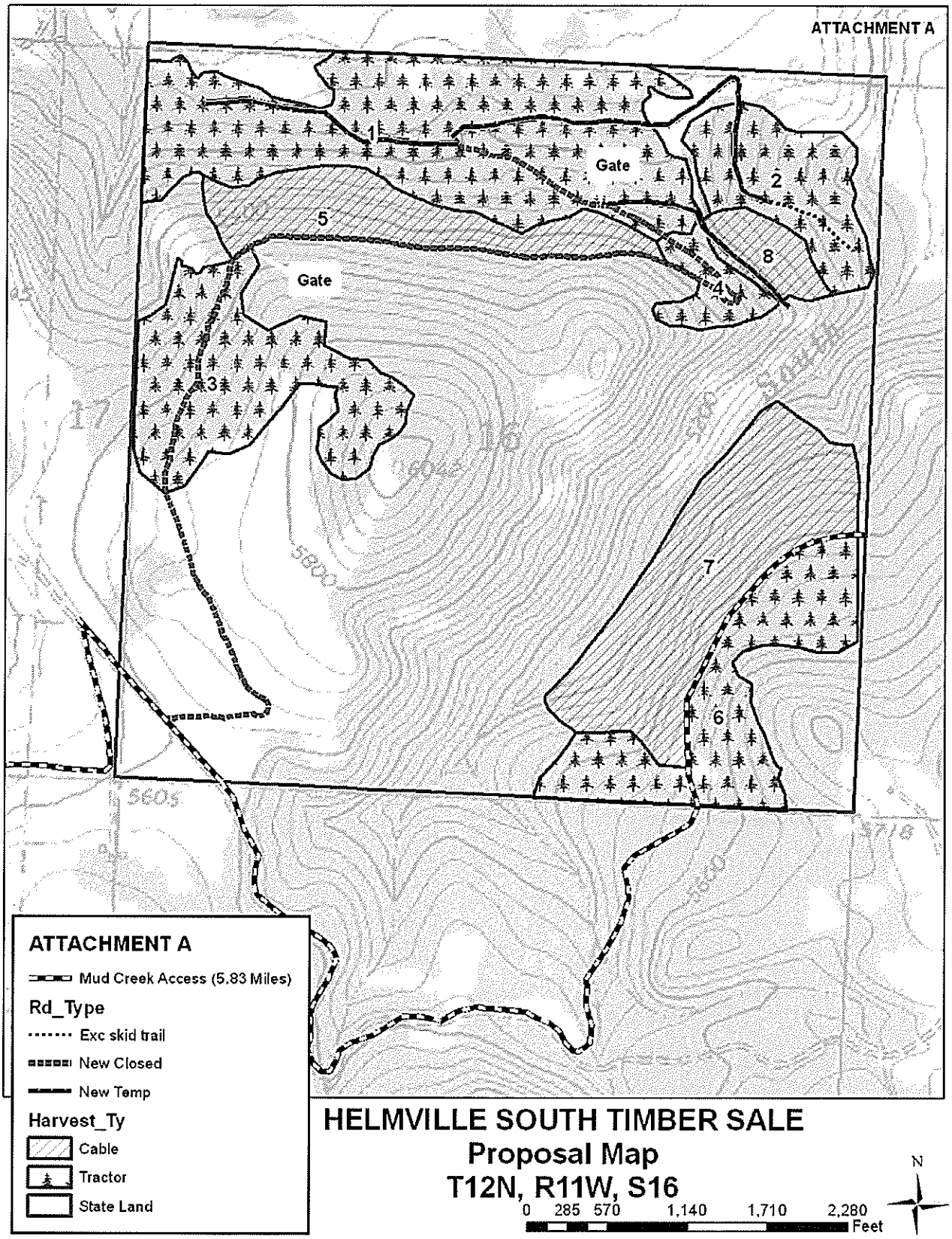
26. SIGNIFICANCE OF POTENTIAL IMPACTS:

No significant or un-acceptable impacts are anticipated with implementation of the Action Alternative.

27. NEED FOR FURTHER ENVIRONMENTAL ANALYSIS:

[ ] EIS [ ] More Detailed EA [X] No Further Analysis

EA Checklist Approved By:	**Name:**	Fred Staedler
	Title:	Unit Manager
Signature:		**Date:** 4-2-14


ATTACHMENT A
Gate
Gate
1
2
3
4
5
6
7
8
5600
5800
5600
5800
ATTACHMENT A
Mud Creek Access (5.83 Miles)
Rd_Type
Exc skid trail
New Closed
New Temp
Harvest_Ty
Cable
Tractor
State Land
HELMVILLE SOUTH TIMBER SALE
Proposal Map
T12N, R11W, S16
N
0 285 570 1,140 1,710 2,280
Feet

Analysis Prepared By:

Name: Garrett Schairer

Title: Wildlife Biologist, Montana DNRC

Introduction

The following sections disclose the anticipated direct, indirect, and cumulative effects to wildlife resources from the proposed action in the project area and cumulative-effects analysis areas described for each resource category. Past and ongoing activities on all ownerships, as well as planned future agency actions, have been taken into account in each cumulative-effects analysis for each resource topic.

Issues

Proposed activities could alter mature forested habitats and/or landscape connectivity, which could affect species that rely on these mature forested habitats, and/or alter connectivity and the ability of wildlife requiring corridors to move through the landscape.

Proposed activities could alter cover, reduce secure areas, and increase access, which could affect grizzly bears by displacing them from important habitats and/or increasing risk to bears of human-caused mortality.

Proposed activities may alter flammulated owl habitat by reducing canopy closure and increasing tree spacing, and could remove snags needed by flammulated owls for nesting.

Proposed activities could reduce suitable nesting and foraging habitat for pileated woodpeckers, which could alter pileated woodpecker use of the area.

Proposed activities could remove forest cover on big game winter range, which could reduce the carrying capacity of the winter range

Regulatory Framework

Various legal documents dictate or recommend management direction for terrestrial wildlife species and their habitats on state trust lands. The documents most pertinent to this project include DNRC Forest Management Rules, the Endangered Species Act, the Migratory Bird Treaty Act, and the Bald and Golden Eagle Protection Act.

Analysis Areas

The discussions of existing conditions and environmental effects within each subsection pertain to land areas of 2 different scales. The first scale of analysis is the Project Area (636 acres), which includes section 16; T12N, R11W of DNRC-managed lands where activities are being proposed. The second scale is the cumulative-effects analysis area, which refers to a broader surrounding landscape useful for assessing cumulative effects to wildlife and habitat. For this proposed project, 2 distinct cumulative-effects analysis areas were identified. The first cumulative effects analysis area includes the project area and the 8 sections surrounding section 16 (5,793 acres). This area is largely privately-owned (5,157 acres; 89%) with only the project area being managed by DNRC (636 acres, 11%). The second cumulative effects analysis area is approximately 34,494 acres and includes the portion of the 'occupied habitat' area bounded by Black Bear Creek, Douglas Creek, Cottonwood Creek, Dry Cottonwood Creek,

South Chimney Peak, and Morris Creek. This cumulative effects analysis area is largely privately-owned (95%); DNRC manages a small portion (1,306 acres; 4%) and there are trace amounts managed by US Bureau of Land Management (1%) and The Nature Conservancy (<1%).

Analysis Methods

Analysis methods are based on DNRC State Forest Land Management Rules, which are designed to promote biodiversity. The primary basis for this analysis includes information obtained by: field visits, review of scientific literature, Montana Natural Heritage Program (MNHP) data queries, DNRC Stand Level Inventory (SLI) data analysis, aerial photograph analysis, and consultation with professionals.

In the fine-filter analysis, individual species of concern are evaluated. These species include wildlife species federally listed under the Endangered Species Act, species listed as sensitive by DNRC, and species managed as big game by the Montana Dept. of Fish Wildlife and Parks (DFWP).

Coarse Filter Wildlife Analysis

Issue

Proposed activities could alter mature forested habitats and/or landscape connectivity, which could affect species that rely on these mature forested habitats, and/or alter connectivity and the ability of wildlife requiring corridors to move through the landscape.

Introduction

A variety of wildlife species rely on mature to old stands for some or all life requirements. A partial list of these species includes pileated woodpeckers (*Dryocopus pileatus)*, American marten (*Martes americana*), brown creepers (*Certhia americana)*, and winter wrens (*Troglodytes troglodytes*). Wildlife species that require connectivity of forest habitat types between patches, or those species that are dependent upon interior forest conditions, can be sensitive to the amount and spatial configuration of appropriate habitats. Some species are adapted to thrive near patch edges, while others are adversely affected by the presence of edge, or the other animals that prosper in edge habitats. Connectivity of forested habitats facilitates movements of those species that avoid non-forested areas and other openings; connectivity under historical fire regimes likely remained relatively high as fire differentially burned various habitats across the landscape.

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the project area (636 acres). Cumulative effects were analyzed on a 34,494-acre area described above in the Analysis Areas portion of this analysis. This scale of analysis would be large enough to support a diversity of species that use mature forested habitats and/or require connected forested habitats.

Affected Environment

The project area currently contains approximately 335 acres (53% of the project area) of mature stands (100-plus years in age) of Douglas-fir and ponderosa pine stands that have a reasonably closed (≥40%) canopy. Currently, forested and semi-forested areas cover most of the project area (519 acres, 82%), facilitating some use by those species requiring connected-forested conditions. On DNRC-managed lands within the cumulative effects analysis area, roughly 640 acres (49% of DNRC-managed lands in the cumulative effects analysis area; 2% of the cumulative effects analysis area) of mature stands with a

reasonably closed canopy exist. On other ownerships, there are roughly 2,985 acres (9% of non-DNRC-managed lands; 9% of the cumulative effects analysis area) of forested stands with ≥40% canopy closure across the cumulative effects analysis area; a portion of those stands are likely mature stands with a reasonably closed canopy. Additionally roughly 30,192 acres (91% of non-DNRC managed lands; 88% of the cumulative effects analysis area) of sparsely stocked, young forest, shrubs, herbaceous, and non-forested types exist in the cumulative effects analysis area, which are not likely providing habitats for species requiring connected stands of mature forests presently. Collectively, up to 3,625 acres (11%) of mature, forested stands with a reasonably closed canopy exist in the cumulative effects analysis area. Connectivity of forested habitats in the project area is fair, but has been affected by past harvesting, roads, and some open, non-forested habitats intermixed within the project area. Connectivity of forested habitats in the cumulative effects analysis area is fairly poor due to past harvesting, several roads, and extensive open, non-forested habitats intermixed with forested habitats. Any ongoing harvesting within the cumulative effects analysis area would continue to alter forested habitats and landscape connectivity.

Environmental Effects- Mature Forested Habitats and Landscape Connectivity

No Action Alternative: Direct and Indirect Effects

No appreciable changes to existing stands would be anticipated. Stands providing forested cover that may be functioning as corridors, including riparian areas, saddles, and ridgelines, would not be altered. No changes in human developments, motorized access, or visual screening would occur. No changes in wildlife use would be expected. Thus, no direct or indirect effects to mature forested habitats and landscape connectivity would be expected since: 1) no changes to existing stands would occur; 2) no changes to human developments, motorized access, or visual screening would occur, and 3) no alterations to existing corridors would be anticipated.

No Action Alternative: Cumulative Effects

No appreciable changes to existing stands would be anticipated. Stands providing forested cover that may be functioning as corridors, including riparian areas, saddles, and ridgelines, would not be altered. Past harvesting has reduced the amount of mature, forested habitats in portions of the cumulative effects analysis area; however, continued successional advances are moving stands toward mature forests. This alternative would continue to contribute to the amount of mature forested stands in the cumulative-effects analysis area. No changes in human developments, motorized access, or visual screening would occur. No changes in wildlife use would be expected. Thus, no cumulative effects to mature forested habitats and landscape connectivity would be expected since: 1) no changes to existing stands would occur; 2) no changes to human developments, motorized access, or visual screening would occur; and 3) no alterations to existing corridors would be anticipated.

Action Alternative: Direct and Indirect Effects

Approximately 121 acres (19% of project area; 36% of existing) of mature Douglas-fir stands with a reasonably closed canopy would be harvested. The majority of those acres would receive treatments that would reduce overall stand density which could reduce habitat for those species relying on mature, closed-canopied forested habitats. Although these treatments would create more open stands that would not likely be used by wildlife species that use mature stands to move through the landscape, functional corridors, particularly along ridges, draws, and other topographic features, would be retained. The only permanent human development constructed would be roughly 1.98 miles of new restricted road and 1.26 miles of temporary road, but these developments would not be expected to concentrate human activity beyond the proposed activities. No changes in legalized motorized human access would occur in the project area. Furthermore contract stipulations would require any unnatural foods and attractants (such as garbage) to be stored in a manner that would prevent wildlife from accessing these unnatural foods.

Some changes in visual screening would occur within individual units, but the combination of irregular-shaped units, topography, and unharvested patches throughout the project area would minimize the effect of the reductions in visual screening. Thus, a minor risk of adverse direct and indirect effects to forested habitat connectivity and wildlife movements would be expected since: 1) proposed activities could reduce forested cover in a portion of the project area, but functional corridors would be retained; 2) minor changes in human developments would occur, but no changes in human developments that would concentrate human activity or human-related attractants would occur; 3) no changes to motorized human access would occur; and 4) visual screening in portions of the project area would be reduced, but considerable visual screening would be retained across the project area.

Action Alternative: Cumulative Effects

Modifications to mature, forested habitats associated with this alternative (121 acres) would be additive to losses associated with past harvesting activities; following proposed treatments, roughly 519 (40%) acres of mature forested habitats with a reasonably closed canopy would exist in the cumulative effects analysis area on DNRC-managed lands. Across ownerships, up to 3,504 acres (10%) of mature stands with a reasonably closed canopy would exist in the cumulative effects analysis area following proposed activities that could provide for wildlife movements. No appreciable changes in the presence of human developments would occur, particularly no changes in the presence of human-related attractants or concentrations of human activities beyond the short duration of proposed activities. No changes to motorized access to the cumulative effects analysis area would occur. Negligible reductions in visual screening in a small portion of the cumulative effects analysis area would be anticipated. Thus, a minor risk of adverse cumulative effects to forested habitat connectivity and wildlife movements would be expected since: 1) proposed activities could reduce forested cover in a small portion of the cumulative effects analysis area, but functional corridors would exist; 2) negligible changes in human developments would occur, but no changes in human developments that would concentrate human activity or human-related attractants would occur; 3) no changes to motorized human access would occur; and 4) visual screening in a small portion of the cumulative effects analysis area would be reduced, but considerable visual screening would persist across the cumulative effects analysis area.

Fine Filter Wildlife Analysis

In the fine-filter analysis, individual species of concern are evaluated. These species include those listed as threatened or endangered under the Endangered Species Act of 1973, species listed as sensitive by DNRC, and animals managed as big game by Montana DFWP. Table WI-2 – Fine Filter provides an analysis of the anticipated effects for each species.

Table WI-2 –Anticipated Effects of the South Helmville Project on wildlife species

Species/Habitat	Potential for Impacts and Rationale [Y/N] Potential Impacts and Mitigation Measures N = Not Present or No Impact is Likely to Occur Y = Impacts May Occur (Explain Below) L = Low Potential for Effects
Threatened and Endangered Species	
Grizzly bear	[Y] Detailed analysis provided below.

(Ursus arctos) Habitat: Recovery areas, security from human activity	
Canada lynx *(Felix lynx)* Habitat: Subalpine fir habitat types, dense sapling, old forest, deep snow zone	[N] The project area occurs outside of the elevations and habitat types where lynx are commonly found in Montana. No lynx habitats were identified in the project area and lynx are not expected to use the project area. Thus, no direct, indirect, or cumulative effects to Canada lynx would be expected under either alternative.
Sensitive Species	
Bald eagle *(Haliaeetus leucocephalus)* Habitat: Late-successional forest less than 1 mile from open water	[N] The proposed project area is outside of any home range associated with bald eagle territories in the vicinity. Thus, no direct, indirect, or cumulative effects to bald eagles would be anticipated.
Black-backed woodpecker *(Picoides arcticus)* Habitat: Mature to old burned or beetle-infested forest	[N] No preferred, recently (less than 5 years) burned areas are in the project area. Thus, no direct, indirect, or cumulative effects to black-backed woodpeckers would be expected to occur as a result of either alternative.
Coeur d'Alene salamander *(Plethodon idahoensis)* Habitat: Waterfall spray zones, talus near cascading streams	[N] No moist talus or streamside talus habitat occurs in the project area. Thus, no direct, indirect, or cumulative effects to Coeur d'Alene salamanders would be expected to occur as a result of either alternative.
Columbian sharp-tailed grouse *(Tympanuchus Phasianellus columbianus)* Habitat: Grassland, shrubland, riparian, agriculture	[N] No suitable grassland communities occur in the project area. Thus, no direct, indirect, or cumulative effects to Columbian sharp-tailed grouse would be expected to occur as a result of either alternative.
Common loon *(Gavia immer)* Habitat: Cold mountain lakes, nest in emergent vegetation	[N] No suitable lakes occur in the project area. Thus no direct, indirect, or cumulative effects to common loons would be expected under either alternative.
Fisher *(Pekania pennanti)* Habitat: Dense mature to old forest less than 6,000 feet in elevation and riparian	[N] No suitable fisher covertypes exist in the project area. Thus, no direct, indirect, or cumulative effects to fisher would be expected to occur as a result of either alternative.
Flammulated owl *(Otus flammeolus)*	[Y] Detailed analysis provided below.

Habitat: Late-successional ponderosa pine and Douglas-fir forest	
Gray Wolf *(Canis lupus)* Habitat: Ample big game populations, security from human activities	[N] The project area is over 7 miles from the suspected Dalton Mountain wolf pack. No den or rendezvous sites are known to occur in the vicinity. Wolves may occasionally use the project area. Should wolves or an active wolf den site be detected in the immediate area, operations would cease, and a DNRC biologist would be consulted. Appropriate mitigations would be developed and applied prior to resuming activities. Thus, minimal direct, indirect or cumulative effects to wolves would be anticipated
Harlequin duck *(Histrionicus histrionicus)* Habitat: White-water streams, boulder and cobble substrates	[N] No suitable high-gradient stream or river habitats occur in the project area. No direct, indirect or cumulative effects to harlequin ducks would be expected to occur as a result of either alternative.
Mountain plover (*Charadrius montanus*) Habitat: short-grass prairie, alkaline flats, prairie dog towns	[N] No prairie dog colonies or other shortgrass prairie habitats occur in the project area. Thus, no direct, indirect, or cumulative effects to mountain plovers would be anticipated to occur as a result of either alternative.
Northern bog lemming *(Synaptomys borealis)* Habitat: Sphagnum meadows, bogs, fens with thick moss mats	[N] No suitable sphagnum bogs or fens occur in the project area. Thus, no direct, indirect, or cumulative effects to northern bog lemmings would be expected to occur as a result of either alternative.
Peregrine falcon *(Falco peregrinus)* Habitat: Cliff features near open foraging areas and/or wetlands	[N] No preferred cliffs or suitable rock outcrops suitable for use by peregrine falcons occur on, or within 1 mile of the proposed project area. Thus, no direct, indirect, or cumulative effects to peregrine falcons would be anticipated as a result of either alternative.
Pileated woodpecker *(Dryocopus pileatus)* Habitat: Late-successional ponderosa pine and larch-fir forest	[Y] Detailed analysis provided below.
Townsend's big-eared bat *(Plecotus townsendii)* Habitat: Caves, caverns, old mines	[N] No suitable caves or mine tunnels are known to occur in the project area or vicinity. Thus, no direct, indirect or cumulative effects to Townsend's big-eared bats would be anticipated as a result of either alternative.
Wolverine *(Gulo gulo)* Habitat: Alpine tundra and high-	[N] Generally wolverines are found in sparsely inhabited, remote areas near treeline characterized by cool to cold temperatures year round and rather deep and persistent snow well into the spring (Copeland et al. 2010). The availability and distribution of food is

elevation boreal and coniferous forests that maintain deep persistent snow into late spring	likely a primary factor in the large home range sizes of wolverines (Banci 1994). The project area is generally below the elevations where wolverines tend to be located. No areas of deep persistent spring snow occur in the project area. Individual animals could occasionally use lands in the project area while dispersing or possibly foraging, and they could be displaced by project-related disturbance if they are in the area during proposed activities. However, given their large home range sizes (~150 sq. mi. -- Hornocker and Hash 1981), and manner in which they use a broad range of forested and non-forested habitats, the proposed activities and alterations of forest vegetation on the project area would have negligible influence on wolverines. Thus, minimal direct, indirect or cumulative effects to wolverines would be anticipated.
Big Game Species	
Elk	[Y] No potential big game security habitat exists in the project area. Mule deer and elk winter range exist in the project area - Detailed analysis provided below.
Moose	
Mule Deer	
White-tailed Deer	

Threatened and Endangered Species

GRIZZLY BEAR

Issue

Proposed activities could alter cover, reduce secure areas, and increase access, which could affect grizzly bears by displacing them from important habitats and/or increasing risk to bears of human-caused mortality.

Introduction

Grizzly bears are native generalist omnivores that use a diversity of habitats found in western Montana. Preferred grizzly bear habitats are meadows, riparian zones, avalanche chutes, subalpine forests, and big game winter ranges, all of which provide seasonal food sources. The search for food drives grizzly bear movements, with bears moving from low elevations in spring to higher elevations through the summer and early fall, as fruits ripen throughout the year. Primary habitat components in the project area include riparian areas and big game winter ranges. Primary threats to grizzly bears are related to human-bear conflicts, habituation to unnatural foods near high-risk areas, and long-term habitat loss associated with human development (Mace and Waller 1997). Forest-management activities may affect grizzly bears by altering cover and/or by increasing human access into secure areas by creating roads (Mace et al. 1997). These actions could lead to the displacement of grizzly bears from preferred areas and/or result in an increased risk of human-caused mortality by bringing humans and bears closer together and/or making bears more detectable, which can increase the risk of bears being illegally shot. Displacing bears from preferred areas may increase their energetic costs, which may, in turn, lower their ability to survive and/or reproduce successfully.

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the project area (636 acres). Cumulative effects were analyzed on a 34,494-acre area described above in the Analysis Areas portion of this analysis. This area approximates the home range size of a female grizzly bear.

Existing Environment

The project area is approximately 14 miles south of the Arrastra Mountain grizzly bear subunit of the Lander Fork Grizzly Bear Management Unit of the Northern Continental Divide Ecosystem grizzly bear recovery area, which has a sizeable grizzly bear population. The project area is in the 'occupied' grizzly bear habitat (Wittinger et al. 2002). Although grizzly bears have not been documented in the project area, use of the project area is possible. Grizzly bears generally use different habitats relative to season. The project area primarily provides mid-elevation forested areas used during the summer along with a small amount of riparian habitat.

Managing human access is a major factor in management for grizzly bear habitat. There are roughly 0.5 miles of roads in the project area (0.5 mi. / sq. mi.) that DNRC cannot be certain are restricted. Open road densities are fairly high in the cumulative effects analysis area (1.3 mi. / sq. mi., simple linear calculation). Hiding cover exists on roughly 474 acres (75%) in the project area. On DNRC-managed lands in the cumulative effects analysis area, hiding cover exists on 527 acres (40% of DNRC-managed lands; 1.5% of cumulative effects analysis area); grizzly bear hiding cover is likely present on much of the 2,985 acres (9% of non-DNRC lands; 9% of cumulative effects analysis area) of forested stands with ≥40% canopy closure in the cumulative effects analysis area. Within the cumulative effects analysis area, hiding cover is largely absent from the 16,321 acres (49% of non-DNRC lands; 47% of cumulative effects analysis area) of shrubs, herbaceous, and non-forested habitats and is likely somewhat limited on the other 13,870 acres (42% of non-DNRC lands; 40% of cumulative effects analysis area) of sparsely stocked and young forest habitats in the cumulative effects analysis area. The habitats in the project area contribute to a 4,146-acre block of potential grizzly bear security habitat (blocks ≥ 0.3 miles from roads receiving motorized use and ≥2,500 acres in size) that extends into the cumulative effects analysis area; within the cumulative effects analysis area 2 blocks totaling 10,174 acres (29% of the cumulative effects analysis area) of potential grizzly bear security habitat exists. Timber harvesting and human development that is occurring or has occurred in the cumulative effects analysis area likely altered grizzly bear habitats and/or human disturbance levels. Across the cumulative effects analysis area, the reductions in hiding cover, the elevated levels of human disturbance, and the mosaic of available habitats likely limits the overall usefulness of the cumulative effects analysis area for grizzly bears.

Environmental Effects- Grizzly Bears

No Action Alternative: Direct and Indirect Effects

No direct or indirect effects to grizzly bears would be anticipated since: 1) no disturbance or displacement would be expected, 2) no changes in hiding cover would occur, 3) security habitat would not be altered, 4) no changes in long-term open-road density would be anticipated, and 5) no changes in availability of unnatural bear foods or attractants would occur.

No Action Alternative: Cumulative Effects

No appreciable changes to existing habitats would be anticipated; advances in succession within those recently harvested stands could improve hiding cover and potentially foraging habitats for grizzly bears. Thus, no further adverse cumulative effects to grizzly bears would be anticipated since: 1) no changes in human disturbance levels would be expected; 2) no changes to open road density would occur; 3) no further modifications to hiding cover would occur; 4) no changes to security habitat would be expected; and 5) no changes in availability of unnatural bear foods or attractants would occur.

Action Alternative: Direct and Indirect Effects

This alternative might affect grizzly bears directly through increased road traffic, noise, and human activity, and indirectly by altering the amount of hiding cover and forage resources. Activities in grizzly bear habitats reduce grizzly bear security, possibly resulting in increased stress and/or energy expenditure to endure the disturbance or to move from the area. These disturbances would only be present during harvesting operations; therefore, the season of disturbance is important in addressing effects to grizzly bears. Proposed activities would occur between July 1 and March 1. No direct effects to grizzly bears would be anticipated for any activities conducted during the denning period. Some disturbance of grizzly bears could be possible with any activities that may occur during the non-denning period. Overall, the proposed activities would avoid the important spring period and would occur in areas where low levels of grizzly bear use would be anticipated, leading to minor potential for disturbance and displacement of grizzly bears.

Hiding cover, defined as vegetation that will hide 90 percent of a grizzly bear at a distance of 200 feet, would be reduced from 474 acres (75%) to 199 acres (31%) in the project area. Some hiding cover in the form of brush, shrubs, and sub-merchantable trees would persist in several of the units, albeit at a reduced level from the existing condition; hiding cover would increase through time as young trees and shrub regeneration proceeds over the next 5 to 10 years. The 4 proposed seedtree or clearcut units would be designed so that visual screening and/or topographic breaks that would hide a grizzly bear would not be more than 600 feet from any point in the proposed units; additionally advanced regeneration in the southern portion of proposed unit 3 would be retained to ensure visual screening needs were met within that unit.

Roughly 1.98 miles of new, restricted roads and 1.26 miles of temporary roads would be constructed with the proposed activities. No changes in open road density or motorized public access would be anticipated. Some increases in non-motorized public access could occur on the newly constructed roads. Although hiding cover would be reduced, no appreciable changes to security habitat would occur given no new open roads would exist in the project area. Contractors would be required to store any unnatural bear foods and attractants (such as garbage) in a bear resistant manner. Compliance with contract terms would frequently be evaluated and would be enforced by a DNRC contract administrator. Any added risk to grizzly bears associated with unnatural bear foods or attractants would be minimal. Thus, a minor risk of adverse direct or indirect effects to grizzly bears would be anticipated since: 1) minor disturbance and displacement would be possible; 2) hiding cover would be reduced in a portion of the project area, but would remain in portions of the project area, and would be expected to recover in the short-term; 3) no changes to security habitat would be expected; 4) no changes to long-term open road density would be anticipated; and 5) negligible increases in the availability of unnatural bear foods or attractants would be anticipated.

Action Alternative: Cumulative Effects

The increased use of road systems during the proposed project could temporarily increase human disturbance to grizzly bears within a portion of the cumulative effects analysis area. Collectively, short-term (2-4 years) increases in human disturbance would be anticipated in the cumulative effects analysis area. Continued use of the cumulative effects analysis area by grizzly bears would be anticipated at levels similar to present. On DNRC-managed lands in the cumulative effects analysis area, hiding cover would continue to be present on 252 acres (19%) and no changes to the hiding cover on other ownerships would be anticipated. Reductions in hiding cover would be additive to the reductions from past timber harvesting, ongoing harvesting, as well as more permanent land-cover changes in the cumulative effects analysis area. Early successional stages of vegetation occurring in harvest units could provide additional foraging opportunities. Quality of grizzly bear security habitat would be reduced in short-term, but would persist through time. No changes in long-term open-road density would be anticipated; an increase in non-motorized access to a small portion of the cumulative effects analysis

area could occur. Thus, a minor risk of adverse cumulative effects to grizzly bears would be anticipated since: 1) increases in human disturbance levels in the short-term could occur in a small portion of the cumulative effects analysis area; 2) hiding cover would be removed in the short-term on 275 acres in the cumulative effects analysis area; 3) no changes in long-term open road density would occur, 4) no changes to security habitat would be expected; and 5) negligible increases in the availability of unnatural bear foods or attractants would be anticipated.

Sensitive Species

FLAMMULATED OWLS

Issue

Proposed activities may alter flammulated owl habitat by reducing canopy closure and increasing tree spacing, and could remove snags needed by flammulated owls for nesting.

Introduction

Flammulated owls are tiny, migratory, insectivorous forest owls that inhabit old, open stands of warm-dry ponderosa pine and cool-dry Douglas-fir forests in the western United States and are secondary cavity nesters. In general, preferred habitats have open to moderate canopy closure (30-50 percent) with at least 2 canopy layers, and are often near small clearings. They usually nest in cavities excavated by pileated woodpeckers or northern flickers in 12-25" dbh ponderosa pine, Douglas-fir, or aspen. Without disturbance, Douglas-fir encroach upon ponderosa pine stands resulting in increased stand density and decreased habitat quality for flammulated owls. Periodic, low-intensity underburns can increase habitat suitability and sustainability by reducing the density of understory seedlings and saplings, stimulating shrub growth, and by protecting large dominant trees from ladder fuels and competition with other mature trees.

Analysis Area

Direct and indirect effects were analyzed on the project area (636 acres). Cumulative effects were analyzed on the 5,793-acre cumulative effects analysis area described above in the Analysis Areas portion. This area includes enough area to support several pairs of flammulated owls (McCallum 1994).

Existing Environment

There are approximately 519 acres (82%) of potential flammulated owl habitats in the dry Douglas-fir stands in the project area. Within the cumulative-effects analysis area, some suitable habitats likely exist on a portion of the 2,320 acres (45% of non-DNRC-managed lands; 40% of cumulative effects analysis area) of open and closed forested habitats on other ownerships; up to 49% of the cumulative effects analysis area could be suitable flammulated owl habitats. A portion of the cumulative effects analysis area has been harvested in the recent past, potentially improving flammulated owl habitat by creating foraging areas and reversing a portion of the Douglas-fir encroachment and opening up stands of ponderosa pine; however retention of large ponderosa pine and/or Douglas-fir was not necessarily a consideration in some of these harvest units, thereby minimizing the benefits to flammulated owls. Modern fire suppression has allowed Douglas-fir in-growth to create denser stands of ponderosa pine and Douglas-fir in portions of the cumulative effects analysis area, which has reduced habitat quality for flammulated owls.

Environmental Effects-Flammulated Owl

No Action Alternative: Direct and Indirect Effects

Existing flammulated owl habitats in the project area would persist. Thus, a negligible risk of adverse direct and indirect effects to flammulated owls would be anticipated since: 1) no disturbance to flammulated owls would be anticipated; and 2) no changes to potential nesting habitats would be anticipated.

No Action Alternative: Cumulative Effects

Existing flammulated owl habitats would persist. Thus, a negligible risk of adverse cumulative effects to flammulated owls would be anticipated since: 1) no disturbance to flammulated owls would be anticipated; and 2) no changes to potential nesting habitats would be anticipated.

Action Alternative: Direct and Indirect Effects

Flammulated owls are tolerant of human disturbance (McCallum 1994), however the elevated disturbance levels associated with proposed activities could negatively affect flammulated owls should activities occur when flammulated owls are present. Proposed timber harvesting on 259 acres of potential flammulated owl habitats (50% of the habitats in the project area) would open the canopy while favoring ponderosa pine and Douglas-fir. Elements of the forest structure important for nesting flammulated owls, including snags, coarse woody debris, numerous leave trees, and snag recruits would be retained in the proposed units. The subsequent regeneration in the existing habitats would likely be beneficial for flammulated owls as potential foraging habitats. The more open stand conditions, the retention of fire adapted tree species, and the maintenance of snags would move the project area toward historical conditions, which is preferred flammulated owl habitat. Thus, a minor risk of adverse direct and indirect effects would be expected to flammulated owls since: 1) the potential exists to disturb flammulated owls; and 2) harvesting would open denser stands up while retaining elements of forest structure used for foraging and nesting by flammulated owl, improving flammulated owl habitat conditions.

Action Alternative: Cumulative Effects

Disturbance to flammulated owls would be possible on a small portion of the cumulative effects analysis area (5%). Proposed harvesting would increase the amount of the cumulative effects analysis area that has been recently harvested, which would add to the amount of foraging habitats available, but possibly at the expense of losing snags and large trees important for nesting. Overall no change in the amount of potential flammulated owl habitats would exist on DNRC-managed lands or any other ownerships; a slight improvement in habitat quality at the cumulative-effects analysis level could be realized with this alternative and the more historic conditions likely after proposed activities. Thus, a negligible risk of adverse cumulative effects to flammulated owls would be expected since: 1) harvesting could disturb flammulated owls in a small portion of the cumulative effects analysis area should activities occur during the period when flammulated owls are in the vicinity; and 2) harvesting would improve the quality and sustainability of flammulated owl habitat on a portion of the cumulative effects analysis area by making this area more representative of historic conditions.

PILEATED WOODPECKERS

Issue

Proposed activities could reduce suitable nesting and foraging habitat for pileated woodpeckers, which could alter pileated woodpecker use of the area.

Introduction

The pileated woodpecker is one of the largest woodpeckers in North America and excavates the largest cavities of any woodpecker. Preferred nest trees are large diameter western larch, ponderosa pine,

cottonwood, and quaking aspen trees and snags, usually 20 inches dbh and larger. Pileated woodpeckers primarily eat carpenter ants, which inhabit large downed logs, stumps, and snags. Aney and McClelland (1985) described pileated nesting habitat as "...stands of 50 to 100 contiguous acres, generally below 5,000 feet in elevation with basal areas of 100 to 125 square feet per acre and a relatively closed canopy." The feeding and nesting habitat requirements, including large snags or decayed trees for nesting and downed wood for feeding, closely tie these woodpeckers to mature forests with late-successional characteristics. The density of pileated woodpeckers is positively correlated with the amount of dead and/or dying wood in stands (McClelland 1979).

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the project area (636 acres). Cumulative effects were analyzed on the 5,793-acre cumulative effects analysis area described above in the Analysis Areas portion of this analysis. This scale includes enough area to support a couple of pairs of pileated woodpeckers (Bull and Jackson 1995).

Existing Environment

In the project area, potential pileated woodpecker nesting habitat exists on approximately 335 (53%) acres. In the cumulative effects analysis area, some suitable habitats likely exist on a portion of the 393 acres (8% of non-DNRC-managed lands) of reasonably closed forested habitats on other ownerships, and some of the 1,957 acres (38% of non-DNRC-managed lands) of moderately to poorly stocked forested stands on those other ownerships could also be suitable foraging habitats. Much of the 2,845 acres (55% of non-DNRC-managed lands) of shrubs, herbaceous areas, and recently harvested stands on other ownerships in the cumulative effects analysis area is likely too open to be useful to pileated woodpeckers. Collectively, the cumulative effects analysis area contains marginal pileated woodpecker habitats.

Environmental Effects-Pileated Woodpecker

No Action Alternative: Direct and Indirect Effects

No direct and indirect effects to pileated woodpeckers would be expected since: 1) no harvesting would occur; 2) no changes in the amount of continuously forested habitats would be anticipated; 3) no appreciable changes to existing pileated woodpecker habitats would be anticipated; and 4) long-term, succession-related declines in the abundance of shade-intolerant tree species, which are valuable to pileated woodpeckers, would be anticipated.

No Action Alternative: Cumulative Effects

No disturbance of pileated woodpeckers would occur. Continued use of the cumulative-effects analysis area by pileated woodpeckers would be expected at similar levels as presently occurring. Thus, no cumulative effects to pileated woodpeckers would be expected since: 1) no harvesting would occur that would alter the amount of continuously forested habitats; 2) no further changes in to existing pileated nesting and foraging habitats would be anticipated; 3) no additional changes to snags or snag recruits would be anticipated; and 4) long-term, succession-related changes in the abundance of shade-intolerant tree species, which are valuable to pileated woodpeckers, would occur.

Action Alternative: Direct and Indirect Effects

Pileated woodpeckers tend to be tolerant of human activities (Bull and Jackson 1995), but could be temporarily displaced by the proposed activities on roughly 278 acres (44% of the project area), should those activities occur during the nesting season. No appreciable disturbance to pileated woodpeckers would be anticipated should the proposed activities occur during the non-nesting period. No activities

would occur between March 1 and July 1, which would limit the potential for disturbance during much of the nesting season. Activities, and thus potential for disturbance, could occur during the later nesting period. Harvesting would alter some of the continuously-forested habitats suitable for pileated woodpeckers in the project area. Roughly 121 acres (36% of existing) of the potential nesting habitat would be too open to be used by pileated woodpeckers following proposed treatments; roughly 214 acres (64%; 34% of project area) of potential habitat would persist in the project area. Following potential reductions in quality associated with the proposed activities, habitats in the project area would gradually improve in quality for pileated woodpeckers over the next 40-80 years. Elements of the forest structure important for nesting pileated woodpeckers, including snags, coarse woody debris, numerous leave trees, and snag recruits would be retained in the proposed harvest areas. Since pileated woodpecker density is positively correlated with the amount of dead and/or dying wood in a stand (McClelland 1979), pileated woodpecker densities in the project area would be expected to be reduced on roughly 278 acres. The silvicultural prescriptions would retain healthy ponderosa pine and Douglas-fir while promoting the growth and/or regeneration of these same species, which would benefit pileated woodpeckers in the future by providing nesting, roosting, and foraging habitats. Similarly, proposed planting of ponderosa pine and western larch could also benefit pileated woodpeckers in the future as those seedlings mature. Thus, a moderate risk of adverse direct and indirect effects to pileated woodpeckers would be anticipated since: 1) harvesting would alter the amount of continuous-forested habitats available; 2) potential nesting habitats and foraging habitats would be removed, but the majority of these habitats would be retained; 3) snags and snag recruits would be removed; however, mitigation measures to retain snags and snag recruits would be included, and 4) proposed treatments would promote seral species in the project area.

Action Alternative: Cumulative Effects

Reductions in pileated woodpecker habitats and further modifications in the amount of continuously forested habitats available in the cumulative effects analysis area would occur within an area with marginal habitats. On DNRC-managed lands, roughly 214 acres (64% of existing) of nesting and foraging habitats would persist following proposed treatments; no further changes to the existing habitats on other ownerships would be anticipated. Snags, coarse woody debris, and potential nesting trees would be retained in the project area; however, future recruitment of these attributes may be reduced in a portion of the area by the proposed activities. Any modifications to pileated woodpecker habitats under this alternative would be additive to modifications associated with past harvesting; continued use of the cumulative-effects analysis area would be expected. Across the cumulative-effects analysis area, continued maturation of stands is increasing suitable pileated woodpecker habitats. Thus, a moderate risk of adverse cumulative effects to pileated woodpeckers would be anticipated since: 1) harvesting would reduce the amount of continuous forested habitats available in the cumulative-effects analysis area; 2) potential nesting and foraging habitats would be reduced; 3) snags and snag recruits could be removed; however, mitigation measures would retain some of these attributes; and 4) proposed treatments would promote seral species in a small portion of the cumulative effects analysis area.

BIG GAME

BIG GAME WINTER RANGE

Issue

Proposed activities could remove forest cover on big game winter range, which could reduce the carrying capacity of the winter range

Introduction

Winter ranges enable big game survival by minimizing the effects of severe winter weather conditions. Winter ranges tend to be relatively small areas that support large numbers of big game, which are widely distributed during the remainder of the year. These winter ranges have adequate midstory and overstory to reduce wind velocity and intercept snow. The effect is that temperatures are moderated and snow depths are lowered, which enables big game movement and access to forage with less energy expenditure than in areas with deeper snow and colder temperatures. Snow depths differentially affect big game; white-tailed deer are most affected, followed by mule deer, elk, and then moose. Thus, removing cover that is important for wintering big game through forest management activities can increase their energy expenditures and stress in winter, but may increase forage production for use on summer range. Reductions in cover could ultimately result in a reduction in winter range carrying capacity and subsequent increases in winter mortality within local big game herds.

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the 636-acre project area. Cumulative effects were analyzed on the 34,494-acre cumulative effects analysis area described above in the Analysis Areas portion of this analysis. This scale includes enough area to support hundreds of elk.

Existing Environment

Montana Department of Fish, Wildlife, and Parks identified mule deer (28 acres) and elk (493 acres) winter range in the project area. These winter ranges are part of larger winter ranges in the area. Mature Douglas-fir, with lesser amounts of ponderosa pine and lodgepole pine stands in the project area are providing attributes facilitating use by wintering big game. Approximately 519 acres of the project area (82%) appear to be providing snow intercept and thermal cover attributes for big game. Evidence of non-winter use by deer and elk was noted during field visits.

Roughly 13,173 acres of winter range (38% of the cumulative effects analysis area) exist in the cumulative effects analysis area; at least 3,625 acres (11%) in the cumulative effects analysis area appear to have sufficient canopy closure to provide thermal cover and snow intercept for big game. In the recent past, harvesting in this area (roughly 13,870 acres; 40% of cumulative effects analysis area) has reduced thermal cover and snow intercept; ongoing harvesting across the winter range could continue altering these attributes while potentially disturbing wintering big game. Portions of the cumulative effects analysis area (approximately 16,321 acres; 47% of cumulative effects analysis area) are in non-forested, herbaceous, or shrub types, which would not be expected to provide thermal cover or snow intercept in the future. Human disturbance within the winter range is associated with residential development, agricultural activities, recreational snowmobile use, commercial timber management, and several roads.

Environmental Effects-Big Game Winter Range

No Action Alternative: Direct and Indirect Effects

No direct or indirect effects to big game winter range would be anticipated since: 1) no further changes in the amount of mature-forested habitats in the winter range would be anticipated; 2) no further changes in thermal cover and snow intercept would be anticipated; and 3) human disturbance levels would not change.

No Action Alternative: Cumulative Effects

Continued winter use of the larger winter range would be expected. No further changes in thermal cover and snow intercept would be anticipated. Human disturbance levels would be anticipated to continue at current levels. No appreciable changes to big game distribution or habitat use would be anticipated. Thus, no cumulative effects to big game winter range would be expected since: 1) no further changes in the

amount of mature-forested habitats in the winter range would be anticipated; 2) no further changes in thermal cover and snow intercept would occur; and 3) human disturbance levels would not change.

Action Alternative: Direct and Indirect Effects

Some logging activities could occur in the winter, and disturbance created by mechanized logging equipment and trucks would likely temporarily displace big game animals during periods of operation for 2 to 4 years. However, winter logging provides felled tree tops, limbs, and slash piles that could concentrate feeding deer during nighttime and quiet periods when logging operations are shut down. Increasing short-term forage availability in this manner may partially offset some of the effects associated with temporary displacement caused by logging disturbance. There would be short-term added risk of disturbance and displacement of wintering animals that could result in moderate adverse effects associated with logging operations, short term road construction, and road use in the project area. However, no long-term effect to winter range carrying capacity or factors that would create long-term displacement or reduced numbers of big game would be anticipated.

Proposed activities would occur on roughly 19 acres (68% of existing in project area) of mule deer winter range and 189 acres (38% of existing) of elk winter range; proposed activities would reduce canopy closure and potential winter use by big game on roughly 259 acres (50% of existing stands) that likely have attributes facilitating considerable winter use by big game. In general, it could take 30 to 50 years for these stands to regenerate and attain a size capable of providing thermal cover for big game. Proposed activities would not prevent big game movement through the project area appreciably in winter and could stimulate browse production in the units. Thus, a moderate risk of adverse direct or indirect effects to big game winter range would be anticipated since: 1) the relatively short-term that logging activities could create disturbance in this area; 2) harvesting would alter a moderate amount of the stands that are providing thermal cover and snow intercept habitats for big game species; and 3) portions of winter ranges for several species of big game would be altered.

Action Alternative: Cumulative Effects

Disturbance and displacement associated with this alternative could be additive to any displacement associated with ongoing activities in the cumulative effects analysis area and any other disturbances that may be affecting wintering big game. Similarly, any harvesting that may be occurring on other ownerships in the cumulative effects analysis area could continue altering big game winter range and/or disturbing big game. Proposed activities would reduce canopy closure on 189 acres of winter range (1% of existing in cumulative effects analysis area); roughly 259 acres (10% of existing) that appear to have attributes facilitating considerable use by wintering big game would be treated, effectively removing those attributes for the next 30-50 years. Modifications to thermal cover and snow intercept in the project area could further reduce the amount of the larger winter range providing these attributes for big game. Continued use of the larger winter range would be expected. Thus, a minor risk of adverse cumulative effects to big game would be anticipated since: 1) the relatively short-term that logging activities would create disturbance in a small portion of the cumulative effects analysis area; 2) a small percentage of the larger winter range would be altered; 3) availability of lower-quality cover in the vicinity that provides some opportunity for big game should they be displaced.

Wildlife Mitigations

- A DNRC biologist will be consulted if a threatened or endangered species is encountered to determine if additional mitigations that are consistent with the administrative rules for managing threatened and endangered species (ARM 36.11.428 through 36.11.435) are needed.

- Motorized public access will be restricted at all times on restricted roads that are opened for harvesting activities; signs will be used during active periods and a physical closure (gate, barriers, equipment, etc.) will be used during inactive periods (nights, weekends, etc.). These roads and skid trails would be reclosed to reduce the potential for unauthorized motor vehicle use.
- Snags, snag recruits, and coarse woody debris will be managed according to *ARM 36.11.411* through *36.11.414*, particularly favoring western larch and ponderosa pine. Clumps of existing snags could be maintained where they exist to offset areas without sufficient snags.
- Contractors and purchasers conducting contract operations will be prohibited from carrying firearms while on duty.
- Food, garbage, and other attractants will be stored in a bear-resistant manner.
- Design clearcut and seed tree units (proposed units 3, 5, 6, and 7) such that no point within those units would be more than 600 feet from visual screening or topographic breaks that would hide a grizzly bear; additionally advanced regeneration in the southern portion of proposed unit 3 would be retained for visual screening.
- Provide connectivity by maintaining corridors of unharvested and/or lighter harvested areas along riparian areas, ridge tops, and saddles.
- Reduce potential for disturbance to spring nesting season and elk calving season by permitting an operating season of July 1 – March 1.

Wildlife References

Aney, W. and R. McClelland. 1985. Pileated Woodpecker Habitat Relationships (revised). Pages 10-17 in Warren, N. eds. 1990. Old Growth Habitats and Associated Wildlife Species in the Northern Rocky Mountains. USFS, Northern Region, Wildlife Habitat Relationships Program R1-90-42. 47pp.

Banci, V. 1994. Wolverine. Pp 99-127 in L. F. Ruggiero, K. B. Aubry, S. W. Buskirk, L. J. Lyon, and W. J. Zielinksi, editors. The scientific basis for conserving forest carnivores: American marten, fisher, lynx, and wolverine in the western united States. USDA Forest Service Rocky Mountain Forest and Range Experiment Station, General Tech. Report RM-254, Fort Collins, Colorado, USA.

Bull, E. L., and J. A. Jackson. 1995. Pileated woodpecker: Dryocopus pileatus. American Ornithologists' Union. Washington DC. 24pp.

Copeland, J. P., K.S. McKelvey, K.B. Aubry, A. Landa, J. Persson, R.M. Inman, J. Krebs, E. Lofroth, H. Golden, J.R. Squires, A. Magoun, M.K. Schwartz, J. Wilmot, C.L. Copeland, R.E. Yates, I. Kojola, and R. May. 2010. The bioclimatic envelope of the wolverine (*Gulo gulo*): do climatic constraints limit its geographic distribution? Can. J. Zool. 88: 233-246.

Hornocker, M. and H. Hash. 1981. Ecology of the wolverine in northwestern Montana. Journal of Wildlife Management 44(3):1286-1301.

Mace, R.D., and J.S. Waller. 1997. Final Report: Grizzly bear ecology in the Swan Mountains, Montana. Montana Fish, Wildlife and Parks, Helena, Montana. 191pp.

Mace, R.D., J.S. Waller, T.L. Manley, L.J. Lyon, and H. Zuuring. 1997. Relationships among grizzly bears, roads, and habitat in the Swan Mountains, Montana. Pages 64-80 *in* Mace, R.D., and J.S. Waller.

1997. Final Report: Grizzly bear ecology in the Swan Mountains, Montana. Montana Fish, Wildlife and Parks, Helena, Montana. 191pp

McCallum, D. A. 1994. Review of technical knowledge: flammulated owls. Pages 14-46 *in* G. D. Hayward and J. Verner, tech eds. Flammulated, boreal, and great gray owls in the United States: a technical conservation assessment. USDA Forest Service Gen. Tech. Rep. RM-253. Fort Collins, Colorado.

McClelland, B.R. 1979. The pileated woodpecker in forests of the Northern Rocky Mountains. Pages 283-299 *in* Role of insectivorous birds in forest ecosystems. Academic Press.

Wittinger, W.T. 2002. Grizzly bear distribution outside of recovery zones. Unpublished memorandum on file at USDA Forest Service, Region 1. Missoula, Montana.2pp.

Helmville Timber Sale – Water & Fisheries Resources Analysis

Analysis Prepared By: Jeff Collins, Hydrologist/Soil Scientist, DNRC, 3/7/14

Introduction

The following analysis discloses anticipated effects to water and fishery resources within the Helmville South project area. The sections on issues & concerns, regulations and mitigations have been combined for water and fisheries resources. Direct, indirect, and cumulative effects to water and fisheries resources of both the No-Action and Action alternatives will be analyzed.

Water & Fisheries Resources Issues

The following issue statements were developed from internal and public scoping regarding the effects of the proposed timber harvest and road systems to water resources and fisheries. . For specific comments and concerns, refer to the project file.

* Water Quality - There is a concern that the proposed action may cause impacts to water quality and quantity from timber management, road construction and road use.

* Cumulative Watershed Effects- There is a concern that the proposed timber harvest may cause or contribute to cumulative watershed impacts as a result of potential increased sedimentation.

* Cold Water Fisheries- There is a concern the proposed forest management actions may have effects to downstream fisheries in Cottonwood Creek due to water quality impacts in South Fork Cottonwood Creek. Comments from FWP were received stating to avoid potential cumulative effects to downstream fisheries by maintaining suitable upstream riparian buffers to protect water quality and provide for in-stream large woody debris.

Regulations, Laws, Rules & Agreements that Apply to Water & Fisheries Resources

The following plans, rules, and practices have guided this projects planning and/or will be implemented during project activities:

Montana Surface Water Quality Regulations
The Blackfoot River and its tributary streams in the project analysis areas are classified as B-1 in the Montana Surface Water Quality Standards (ARM 17.30.623). The water quality standards for protecting beneficial uses in B-1 classified watersheds are described in ARM 17.30.623. The B-1 classification is for multiple use waters suitable for; domestic use after conventional treatment, growth and propagation of cold-water fisheries, associated aquatic life and wildlife, agricultural, and industrial uses. Other criteria for B-1 waters include; no increases are allowed above naturally occurring concentrations of sediment, which will prove detrimental to fish or

wildlife and a maximum 1 degree Fahrenheit increase above naturally occurring water temperature is allowed within the range of 32 to 66 degrees Fahrenheit.

Naturally occurring includes conditions or materials present from runoff or percolation on developed land, where all reasonable land, soil, and water conservation practices have been applied. Reasonable conservation practices include methods, measures, or practices that protect present and reasonably anticipated beneficial uses. The State has adopted Forestry Best Management Practices BMP's through its Non-point Source Management Plan as the principle means of controlling non-point source pollution from silvicultural activities. DNRC provides further protection of water quality and sensitive fish through implementation of the Streamside Management Zone (SMZ) Laws and Forest Management Rules.

Water Quality Limited Waterbodies and Beneficial Uses
The proposed project is located within the Lower Sturgeon Creek 6Th HUC 170102030413, and Cottonwood Creek 6th HUC 170102030408. Lower Sturgeon Creek and the South Fork Cottonwood Creek (surrounds the project section) are not listed as impaired on the State's 303(d) list of impaired bodies of water (MTDEQ 2012). The main stem of the Cottonwood Creek (MT 76F003-90), below the South Fork Cottonwood Creek was listed as water quality impaired for not supporting aquatic life and recreation. The probable cause of impairments on lower Cottonwood Creek are; sedimentation, water temperature and low flow alterations (irrigation diversions). The probable source listed is agriculture.

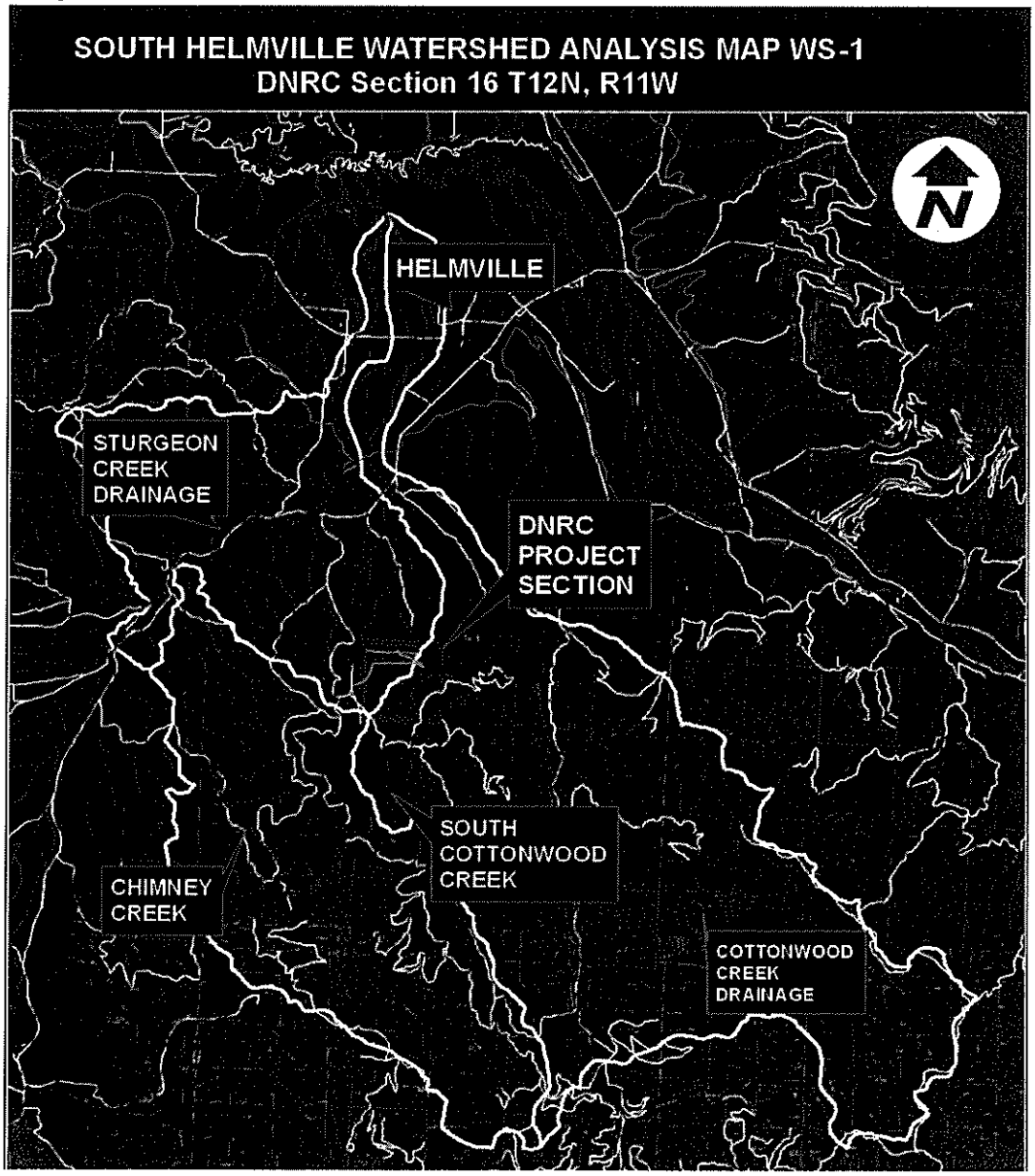
Beneficial Uses- Downstream beneficial uses include agriculture, aquatic life, drinking water and recreation. There are no water rights on the DNRC parcels proposed for harvest. There is an irrigation diversion and pond on private land downstream of the project area.

Montana Streamside Management Zone (SMZ) Law
All rules and regulations pertaining to the SMZ Law will be followed. An SMZ width of 100 feet is required on Class I and II streams when the slope is greater than 35%. As stated in SMZ ARM 36.11.302(ii), where the slope of the SMZ decreases to 15% or less to form a bench that is 50 to100 ft. from the ordinary high water mark and at least 30 ft. wide, the SMZ boundary is located at the edge of the bench nearest the stream. An SMZ width of 50 feet is required when the slope is less than 35%. There is one SMZ harvest boundary in the project area that is adjacent to and upslope of South Fork Cottonwood Creek in the SE corner of Section 16, T12N, R11W.

DNRC Forest Management Rules and Habitat Conservation Plan
All applicable State Forest Land Management rules and regulations regarding watershed and fisheries management would be followed. This includes, but is not limited to rules listed for water quality (ARM 36.11.422), cumulative effects (36.11.423) Riparian Management Zones RMZ (ARM 36.11.425), Fisheries (ARM 36.11.427) and Conservation Strategies outlined in the DNRC Habitat Conservation Plan (HCP 2011) where applicable. As part of ARM 36.11.427(3)(a)(i) and (iv) and ARM 36.11.436, DNRC is committed to designing forest management activities to protect and maintain bull trout, westslope cutthroat trout and all other sensitive fish and aquatic species as noted in the fisheries assessment. South Cottonwood Creek is considered a Class 1 stream. No actions are proposed within the SMZ of 50-100feet of South Fork Cottonwood Creek. The HCP requires no-harvest within 50 feet of a class 1 fisheries stream.

Water Resources Analysis Methods and Areas

A watershed analysis and field survey was completed by a DNRC hydrologist for the proposed project to determine direct, indirect and cumulative effects to water quality. The water quality evaluation included a review of existing inventories for water resources (NRIS 2013), road inventories, reference to previous DNRC projects, and comparisons of aerial photos combined with GIS. This report will assess the potential effects of sediment delivery on water quality, and large woody debris will be assessed in the fisheries section. A field review was completed for the proposed harvest units, condition of access roads and associated streams and the observations, information and data were integrated into the watershed analysis and design of project mitigations.



Sediment delivery

The analysis areas for sediment delivery effects to water quality are limited to the harvest units and roads used for hauling and will focus on the streams described as affected watersheds. Refer to the hydrology map WS-1 for analysis areas that encompass the proposed harvest units and road haul routes. A road inventory was completed for sediment sources and to design

mitigation measures where needed. The analysis includes in-channel and upland sources of sediment that could result from this project. In-channel areas include the stream channels adjacent to and directly downstream of harvest areas. Upland sources include harvest units and roads that may contribute sediment delivery as a result of this project. The measurement criteria for this sediment analysis are 1) miles of new road construction and road improvements and 2) potential for sediment delivery to streams.

Cumulative watershed effects can be characterized as impacts on water quality and quantity that result from the interaction of past, current or foreseeable future disturbances, both natural (fire) and human-caused. A DNRC hydrologist completed a coarse filter qualitative assessment of watershed conditions and cumulative effects as outlined in the Forest Management Rules (ARM 36.11.423) and the commitments described in the HCP concerning watershed management. The analysis areas for watershed cumulative effects include the watersheds that wholly surround the DNRC project sections and the access roads to those sections. Past, current, and future planned activities have been taken into account for the cumulative effects analysis.

Water Yield concern dismissed from further analysis
There is low risk of direct, in-direct or cumulative effects to water yield from the proposed forest management actions, and this concern will be dismissed from further analysis based on the following.

- The proposed harvest is within the Lower Sturgeon Creek and Cottonwood Creek 6th code HUCS.
- The proposed seed tree and shelterwood harvest of 145 acres is less than 1.7% of the Sturgeon Creek drainage, which is over 80% rangelands, has low precipitation (19" yearly average) and runoff.
- The proposed seed tree and shelterwood harvest of 135 acres is less than 1 % of the Cottonwood Creek drainage, which has had low harvest effects and has moderate precipitation (27" yearly average) and runoff.
- The proposed minor harvest in the foothills of these drainages is not expected to have a measurable effect on water yield or stream channel stability.

Affected Watersheds

The proposed harvest areas are located within the Montana school trust Section 16, T12N, R11W approximately 5 air miles south of Helmville, Montana (refer to Watershed Map WS-1). Section 16 includes a ridgeline bearing SW to NE, that forms the divide between South Fork Cottonwood Creek that is a tributary within the larger Cottonwood Creek drainage (6th HUC 170102030408) and the Sturgeon Creek drainage (6Th HUC 170102030413). Within the 19,756 acre, Cottonwood Creek drainage, state lands account for 3% of the drainage and 140 acres is proposed for harvest. Cottonwood Creek is about 70% forest and the average precipitation in is 26" /year mainly as snow. The analysis area supports a mixed forest of lodgepole pine, Douglas-fir, ponderosa pine, and western larch.

Within the Lower Sturgeon Creek drainage is 8633 acres in area and state lands account for 10% of the drainage, and 145 acres is proposed for harvest. Lower Sturgeon Creek is mainly rangelands and less than 10% forest, with an average precipitation of 19" /year mainly as mixed snow and rain. The existing Mud Creek access road is located within the Chimney Creek drainage (6th HUC 170102030412) and proposed operations in this drainage would be limited to hauling and road maintenance.

Existing Conditions- Water Resources & Water Quality

Past management activities in the project area include timber harvest, road construction, fire suppression, grazing, and recreation. Historic uses in the Sturgeon Creek drainage are mainly agriculture and grazing.

Sediments
The proposed haul route would use the Mud Creek existing private road from HWY 271, across open range sites, and the road is used year round for management access and to homesites. There is one crossing of Chimney Creek and several unnamed ephemeral channels and there are segments of the access road that do not adequately meet BMP's for road surface drainage. The maintenance and repairs to fully meet BMP's, include the need for rock armoring of culvert inlets and repairs or maintenance grading of road surface drainage features. A short segment of the access road parallels the intermittent segment of Mud Creek in the upper drainage and has sediment delivery.

Within the state lands section 16, T12N, R11W, only minor previous harvest has occurred for road construction and post cutting, and this previous harvest has no impacts to sediment in the project parcel. There are 65 grazing AUM's on this tract of mixed range and forest, and the grazing season is June 1 to September 30th. Grazing use has occurred since at least the early 1960's. Grazing reviews have been completed periodically about every 5 years and grazing use has varied. There is use by both livestock and wildlife and upland sites are good to excellent condition based on field reviews. The South Fork Cottonwood Creek flows through a narrow rocky canyon that forces cow trails to occur next to the stream bottom.

Segments of the stream channel are poorly developed and in fair to poor condition due to bank trampling and impacts stream sediments. Where downed logs occur across the stream channel, the grazing impacts are reduced as animals trails are forced away from the stream banks. DNRC and the grazing licensee continue to work on ways to reduce grazing impacts along the South Fork Cottonwood Creek. It is difficult to totally exclude animals from the riparian canyon portion of stream, and long term improvements are expected to improve slowly.

Environmental Effects

No Action Alternative: Direct, Indirect, and Cumulative Effects
Implementation of the no-action alternative would result in no water resource impacts in the project area. Water quality effects would remain similar to those described in the existing conditions sections of this report.

Action Alternative: Direct, Indirect, and Cumulative Effects
Implementation of the action alternative is a combination of salvage harvest of dead, dying and high-risk trees to reduce competition, promote regeneration of diverse conifer species and improve tree growth. Approximately 280 acres would be harvested using a combination of 80 acres cable logging and 200 acres ground based skidding. Selective harvest may occur in segments of the RMZ within a parallel band of 50 to 80 feet from South Cottonwood Creek, where the SMZ width is 50ft. based on slope.

The RMZ harvest may occur on segments of up to total 800 feet in length (up to 1/2 acre area) and at least 50% of trees would be retained. Approximately 2 miles of new permanent, closed

road, and 1 ¼ miles of temporary road would be constructed for this project. Approximately 6 miles of existing roads would be maintained and improved to meet BMP's and control sedimentation for the period of DNRC operations.

Sediments
As noted in the soils resource analysis, there is low potential for off-site erosion from the harvest areas based on the location of most harvest units away from surface waters, water infiltration rates that exceed most runoff events and implementation of BMP's for erosion control. Cable harvest would be used on steeper sideslopes to limit soil disturbance. No harvest would occur within the SMZ areas of South Fork Cottonwood Creek that are 50 to 100 feet in width (based on slope) to maintain effective buffers to potential sediment to protect water quality. Three small areas of tree windthrow and marginal slope stability occur on less than 4 acres within one of the harvest units and are not near the stream. These sites would be protected by selective thinning and avoiding skid trails or roads through the sites. The site specific mitigations are not expected to instigate slope instability as noted in the soils report, and there is low potential for sediment delivery to surface waters, due to the mitigations and long distance to surface waters.

All of the proposed roads are located on dry stable sites and would be constructed to meet BMP's and include mitigations to install and maintain road drainage features. No new perennial stream crossings are proposed. There is one ephemeral draw crossing and this intermittent channel has very short duration flow in the spring and does not have connectivity downslope to any surface waters. All new roads would be grass seeded with site adapted grass to speed revegetation and control erosion and weeds.

On the existing haul roads, maintenance and site specific road repairs would be implemented to improve road drainage and control erosion. Forest harvest and road operations would be monitored to ensure compliance with resource mitigations and BMP's. Overall there would be reductions in site specific sediment sources, with short duration direct effect of low sediments from road repairs and an overall low to risk of direct and in-direct downstream effects on water quality.

Cumulative effects
The coarse filter analysis concluded there is low potential for additional cumulative effects from the proposed forest management actions based on the following; low to moderate levels of previous harvest in the analysis area, no new stream crossings, and no proposed harvest in the SMZ of South Fork Cottonwood Creek. The proposed new roads are located on dry and stable sites that avoid areas of marginal slope stability, with one ephemeral draw crossing, and no potential delivery to surface waters. About 1 1/4 miles of temporary road would be reclaimed and stabilized at conclusion of use. Road maintenance and repairs would be made along the access route during the period of use, to reduce sediment at existing stream crossings and improve water quality.

The sediment effects of grazing on South Fork Cottonwood Creek would not be impacted by the proposed forest treatments and DNRC would continue to work with the grazing licensee on ways to reduce grazing impacts along the South Fork Cottonwood Creek and long term improvements are expected to improve slowly.

Fisheries Analysis Methods and Areas

This analysis will consider the presence of fish and potential effects of sedimentation on fisheries resources. The analysis will tier to the regulations, guidelines and methods outlined in the Water Resources Analysis of this report. The analysis areas to evaluate existing and potential impacts to fisheries are the general watershed areas as described in the water quality and quantity section and noted on Watershed map WS-1.The initial fisheries analysis areas were chosen because they include: (1) the watersheds of known or potential fish-bearing streams and (2) the proposed harvest units and associated roads that could have measurable or detectable impacts to those fish-bearing streams or (3) fisheries resources raised during scoping.

Sediment Delivery
The analysis area for sediment delivery is limited to the harvest units and roads used for hauling. This includes in-channel and upland sources of sediment that could result from this project. The analysis methods for sediment delivery will follow those used in the Hydrology portion of this report.

Large Woody Debris Recruitment
The analysis area for woody debris is the portions of the proposed cable harvest unit adjacent to the South Fork Cottonwood Creek parcels that is considered a fish-bearing stream. The analysis method for woody debris recruitment will evaluate the potential reduction in available woody debris due to timber harvest activities.

Shading and stream temperature
The analysis area for vegetative shading and stream temperature is the portions of the DNRC parcels that are adjacent to the South Fork Cottonwood Creek parcel that is considered a fish-bearing stream. The analysis method will evaluate the potential reduction in vegetative shading due to timber harvest activities and the anticipated effects to stream temperatures.
Fish habitat connectivity is dismissed as an issue since there are no existing stream crossings on the state lands projects parcel, no new stream crossings are proposed and there would be no change to existing crossing on the temporary use private access road.

The cumulative effects analysis area for sediment delivery is limited to the proposed harvest units and roads used for hauling as noted in the water resources analysis (See map WS-1). This includes in-channel and upland sources of sediment that could result from the project.

Existing Conditions- Fisheries

Cottonwood Creek is a fish-bearing stream supporting westslope cutthroat trout and other minor species. Westslope cutthroat trout is a sensitive species. There are no indications that the small streams in the analysis area support bull trout. There is no fish habitat or population information available on the South Fork Cottonwood Creek (MFISH 2013). No fisheries were identified in Mud Creek. The South Fork Cottonwood Creek drainage is about 3.5 miles long and there are no stream crossings on the state lands project parcel and few in the drainage.

Sediment Delivery
There is one intermittent and one perennial stream crossing in the headwaters of South Fork Cottonwood Creek. The perennial crossing has low flow and unlikely to support fish. The culvert sites are sources of sediment from road drainage and grazing uses. The access road system is a private controlled access road not open to the public, and traffic use is light. Stream channel

conditions along South Fork Cottonwood Creek are fair to poor, and sources of sediment from animal bank trampling and trails. There are moderate levels of timber harvest in the area, but low effects on water quality.

Large Woody Debris Recruitment
No previous riparian harvest has occurred in the state lands parcel and there is considerable large woody debris in the South Fork Cottonwood stream channel from tree mortality due to insects and disease. There are moderate to high levels of large woody debris along the South Fork Cottonwood Creek in the project area.

Shading and Stream Temperature
No previous riparian harvest has occurred in the state lands parcel. South Fork Cottonwood Creek is not listed as a temperature impaired stream. There are varied levels of shading from tree mortality due to insects and disease, which are natural conditions.

Fishery Resources - Environmental Effects

No Action Alternative: Direct, Indirect, and Cumulative Effects
Implementation of the no-action alternative would result in no fisheries resource impacts in the project area. Fisheries condition would remain similar to those described in the existing conditions sections of this environmental assessment.

Action Alternative: Direct, Indirect, and Cumulative Effects
Implementation of the action alternative is a combination of regeneration, selection and salvage harvest of dead, dying and overstocked trees to improve growth and regeneration of diverse tree species. Forest health is declining due to forest stand age, and mortality from insects and root diseases. The proposed harvest is moderate intensity, selection and regeneration harvest of 280 acres. An RMZ of 80 feet was designated along the South Fork Cottonwood Creek based on the stand potential tree height. The SMZ width adjacent to South Fork Cottonwood Creek varies from 50 to 100 feet based on slope. No harvest would occur in the SMZ, and would continue to provide for large woody debris recruitment and shading. Selective harvest of 50 percent of merchantable trees would occur in segments of the RMZ within a band of 50 to 80 feet from South Cottonwood Creek. The RMZ harvest may occur on segments of up to combined total of 800 feet in length that represents an area of up to 1/2 acre. An analysis of similar riparian harvest prescription in the Environmental Impact Statement for the Forested State Trust Lands Habitat Conservation Plan indicates there would be a low risk of impacts to woody debris and stream shading (and stream temperatures affected by direct solar radiation). Due to the limited magnitude and small extent of the RMZ treatments, a low impact to woody debris and stream shading is expected in the assessment area. The RMZ harvest would be completed by cable operations that result in low soil disturbance and there is low potential for sediment delivery from the proposed harvest areas or effects to water quality or fishery resources.

Approximately 3.25 miles of new road would be constructed on dry sites with no new stream crossings. On existing roads, road maintenance, site specific road reconstruction requirements, all BMP's would be implemented to improve road drainage and control erosion. Road maintenance and repairs may cause short duration, low levels of sedimentation that would be expected to quickly subside and reduce sediments compared to no-action. All new roads would be grass seeded with site adapted grass to speed revegetation and control erosion and

sedimentation. Following the harvest about 1 ¼ miles of temporary road would be stabilized and abandoned.

The proposed project has would cause to low to moderate, short duration direct effects to sediments and low potential for direct, indirect or cumulative impacts to fisheries based on the following: no harvest within the SMZ of the South Fork Cottonwood Creek, moderate harvest away from streams, planned road repairs and maintenance to reduce sediment, planned road construction is on dry sites with no new stream crossings, implementation of BMP's, applicable rules and attached mitigations. The sediment effects of grazing on South Fork Cottonwood Creek would not be addressed by the proposed forest treatments and DNRC would continue to work with the grazing licensee on ways to reduce grazing impacts along the South Fork Cottonwood Creek and long term improvements are expected to improve slowly.

Water & Fishery Resource Mitigations

The analysis and levels of effects to Water and Fishery resources are based on implementation of the following mitigation measures.

* DNRC would implement all applicable Best Management Practices (BMP's), Montana Administrative Rules for Forest Management, and reasonable mitigation and erosion control p-ractices during timber harvest, road maintenance, and road construction and road use activities. The commitments of the DNRC Habitat Conservation Plan (HCP) would be implemented on the applicable parcels.

* DNRC would locate, clearly mark and maintain suitable water resource protection boundaries including Riparian Managament Zone (RMZ) of 80 ft. with Streamside Management Zones (SMZ's) and Wetland Management Zones (WMZ's) adjacent to streams and wetlands consistent with State Forest Land Management Rules. An RMZ/ SMZ boundary of 80 to 100 feet as appropriate would be located along South Fork Cottonwood Creek in Section 16, T12N, R11W.

* Mitigations to reduce soil impacts and control erosion on skid trails and cable corridors would be implemented to protect water quality including limiting harvest and hauling operations to periods when soils are relatively dry, (less than 20%), frozen or snow covered to minimize soil compaction and rutting, and maintain drainage features.

* Existing and new roads would be maintained concurrently in association with the harvest and road use activities. Road improvements would include surface blading, rock armor culvert inlets, and installation of road drainage features to prevent surface erosion and sediment delivery to streams as needed to comply with BMP'S, and to protect water quality.

* New road construction, including drainage features should be completed in the summer or fall prior to freeze-up or periods of expected high rainfall.

* All newly disturbed soils on road cuts and fills would be promptly reseeded to site adapted grasses to reduce erosion/sediment from roads.

Water & Fishery References

MT DNRC , Environmental Assessments of past DNRC timber sales and road projects including; Deadman T.S., Warm Springs T.S., No-Name Creek T.S., and minor salvage permits, Anaconda and Clearwater Unit Offices.

MT DNRC. 2003 Montana Administrative Rules for Forest Management on DNRC Forested Lands. Montana DNRC. Trust Lands Management Division. Helena, MT.

Montana DNRC. 2010, 2012 Multiple reports, Montana Forestry Best Management Practice Audit Reports. Forestry Division. Missoula, MT.

MT DNRC. 2010. DNRC Habitat Conservation Plan, Final EIS Forest Management Bureau Division, Missoula, Montana.

MT DNRC, 2011. Best Management Practices for forestry in Montana. Available online at www.dnrc.mt.gov/forestry/assistance/practices/documents/bmp.pdf; Last accessed August 3, 2012.

NRIS, Montana Natural Resources Information System, Internet database search for water, water rights, and fisheries, 2012. http://nris.state.mt.us/interactive.html

Helmville South Timber Sale – Soils & Noxious Weeds Analysis

Analysis Prepared By: Jeff Collins, Hydrologist/Soil Scientist, DNRC, 3/7/14

Introduction

The following analysis describes the existing soil conditions and the anticipated effects to soil resources and noxious weeds within the Helmville South project area. Direct, indirect, and cumulative effects to soil resources and noxious weeds of both the No-Action and Action alternatives will be analyzed.

Issues

Soil Resources – There is a concern that forest management activities may result in increased erosion and reduced soil productivity where excessive disturbance from compaction, displacement, or loss of nutrients occurs, depending on the extent and degree of harvest related soil effects.
There is a concern that harvest operations or road construction may impact areas of marginal slope stability.

Regulatory Framework

The following plans, rules, and practices have guided this projects planning and/or would be implemented during project activities:
All applicable Best Management Practices, State Forest Land Management rules and regulations, and measures outlined in the DNRC Habitat Conservation Plan would be implemented. This includes, but is not limited to silviculture considerations for sustained forest growth (ARM 36.11.420) and biodiversity. As required by ARM 36.11.410 and 36.11.414, adequate vegetative debris shall be left on site to support nutrient conservation. Whole tree skidding shall be discouraged unless mitigation measures are taken to retain a portion of (fine litter) nutrients on site. The proportions of vegetative materials retained are based on the range of comparable levels determined by Graham et al (1994) for representative vegetation types.

Analysis Methods & Analysis Areas

The methods for disclosing impacts for this analysis include using general soil descriptions and management limitations and then qualitatively assess the risk of negative effects to soil productivity from compaction, displacement and erosion from each alternative.
The soils analysis included an evaluation of Powell County Soil Survey data, air photos, past harvest designs and on-site field reviews by DNRC hydrologist/soil scientist. For the purposes of this analysis, minor soils of 5% or less of the area were grouped based on slope, soil properties and interpretations. Field review was conducted to verify the soil properties and current conditions to assess past and predicted effects based on DNRC soil monitoring results from over 80 DNRC post-harvest monitoring projects (DNRC, 2006, 2011). The soil analysis

considered soil management interpretations and the physical effects to soils from the area and degree of harvest disturbance associated with skidding and roads. The analysis for soil nutrients considers the area of disturbed surface and the fine litter and coarse woody debris available to supply organic materials to the soil. While the anticipated impacts from each alternative will disclose the direct/indirect effects, the cumulative impacts will be the result of any previous and proposed activities. Slope stability will be assessed considering parent materials, on-site indicators of stability including slumps and the potential effects of road locations and harvest. The direct, indirect and cumulative effects analysis areas- for geology and soil resources includes the proposed harvest units and locations of existing roads and the new and temporary roads proposed for construction within state Section 16, T12N R11W.

Existing Conditions

The proposed harvest areas are located on the mountain sideslopes and ridges between the Cottonwood Creek and Sturgeon Creek watersheds. South Cottonwood Creek flows through a rocky canyon within state section 16, that trends SW to NE. The bedrock geology in the project area includes Pre-Cambrian age meta-sedimentary quartzites, argillites and limestones that are mainly well fractured with Tertiary age clay rich sediments on footslopes and midslopes. The upper midslopes and mountain sideslopes are steep and have soils forming in moderate to deep colluvial soils with gravelly and gravelly clay subsoils.

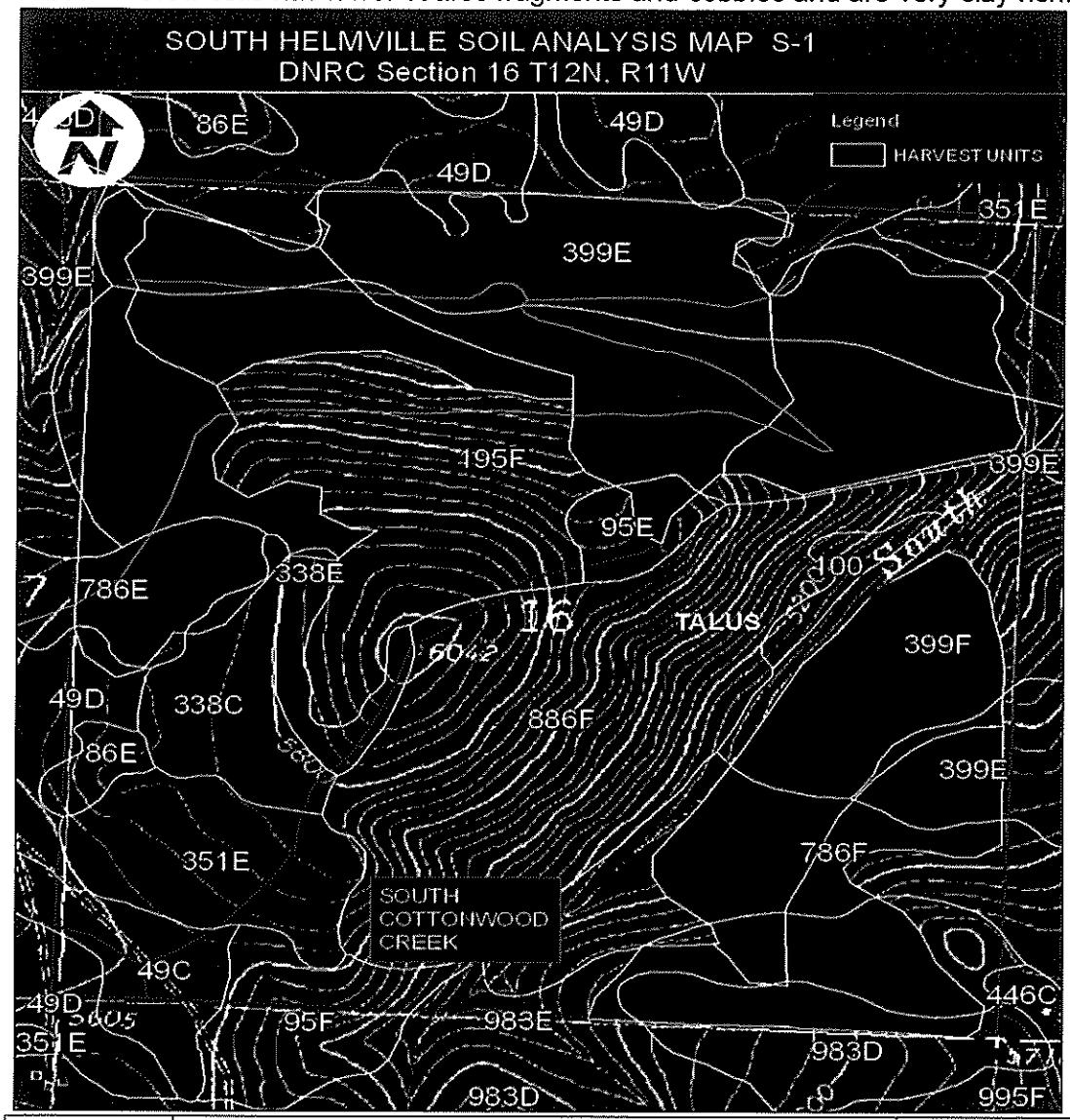
Bedrock outcrops are common on steeper sideslopes and ridges, and generally rippable, although some spot locations may require jackhammer or blasting for road construction where bedrock is exposed. Balanced road cut/fills are practical up to 55% where slope steepness increases the quantity of material excavated. Material exposed by road construction is subject to rock ravel on steep cutbanks and is difficult to revegetate.

No especially unusual or unique geologic features occur in the project area. Most of the areas proposed for harvest are stable, with the exception of small areas of marginal slope stability in the NE corner of the section. The several shallow, rotation slump features have a combined area of about 4 acres and are located on clay rich deposits on steep slopes and may have been instigated by windthrow and minor earth tremors.

Soil map units are derived from the Powell County Soil Survey and summary properties and management interpretations are displayed on Soil Maps S-1 and described in attached soil appendix table.

Primary map units in the proposed harvest area are complexs of Yreka, Bignell, Crow and Winkler on moderate to steep slopes. Yreka soils in the project area are moderately deep gravelly loam surface over very gravelly clay loams. Upper slopes and ridges include more shallow slopes supporting mainly lodgepole. Bignell soil has a cobbly surface with clayey

subsoils. Crow soils has lower coarse fragments and cobbles and are very clay rich.



MAP UNIT	SOIL MAP UNITS Interpretations in Appendix	% of Project
399E	Bignell-Yreka complex, cool, 15 to 35 percent slopes	28.7
399F	Bignell-Yreka complex, cool, 35 to 60 percent slopes	10.7
195F	Yreka gravelly loam, cool, 35 to 60 percent slopes	35.9
983D / E	Crow-Bignell complex, 8 to 35 percent slopes	11
86E	Winkler gravelly loam, cool, 15 to 35 percent slopes	5.2
786F	Winkler gravelly loam, cool, 35 to 60 percent slopes	8.2
	The Following Map Units are Less than 1 % of Project	
95E	Yreka gravelly loam, 15 to 35 percent slopes	Forest
338 C /E	Perma cobbly loam, C= 4-8%/ E= 15 to 35 percent slopes	Range-Road
49D / 149D	Danvers cobbly clay loam, 8 to 15 percent slopes	Range-Road

Bignell and Crow and are the most sensitive to rutting and compaction if operated on when wet and soil strength is low. These finer textured soils occur on more concave and moderate slopes, and are higher productivity sites that tend to remain moist later into the spring and support ponderosa pine, Douglas-fir and pockets of western larch. Erosion potential is moderate to high depending on slope, and can be mitigated by more closely spaced surface drainage features on skid trails and road locations. The more moderate slopes less than 30% have a high risk of compaction and rutting if operated on when wet, which can be mitigated by season of use limitations if operations are avoided when soils are wet, which is usually short duration, typically from March to June, as precipitation is moderate .

Winkler very gravelly sandy loams occur in the SE corner of the section and are shallow to moderately deep on 30-60% slopes (dry phase). Surface soils are shallow and low to moderate productivity sites supporting ponderosa pine and Douglas fir. The Winkler soils have lower fine contents and lower soil moisture retention. Competition for moisture from understory vegetation and high solar insolation can constrain conifer growth and regeneration. Conifers are subject to drought stress on these very well drained rocky soils.

Primary soils concerns are avoiding displacement of shallow surface soils. Erosion risk can be effectively controlled with standard drainage practices and implementation of BMP's. Predominant slopes of 10-45% in the project are well suited to ground based skidding operations and have a long operational season of use, once soils dry out in the spring. Slope steepness over 45% limits tractor operations due to potential for excessive disturbance and erosion. Cable operations on steeper slopes reduce ground disturbance and impacts. Sediment delivery is concern on the finer textured soils within and adjacent to riparian areas, yet can be mitigated by implementation of buffer areas and implementation of Best Management Practices (BMP's).

Effects of Past Management

There is very minor previous harvest in Section 16, of post cutting and construction of a road in the SE corner of the section. The existing road is stable and located well away from South Cottonwood Creek.

Nutrient Cycling & Soil Productivity

With no previous harvest there are moderate to high levels of existing downed coarse woody debris across the proposed harvest areas that is representative of woody debris levels on similar vegetation types measured by Graham et al. (1994). The tree mortality of insects and disease has resulted in many trees shedding their needles, which helps return organic matter and nutrients to the soil. Root rot pockets may be a partial result of increased vegetative stress on droughty sites and shallow soils (Filip 1989), or on areas of partial thinning where high stocking levels of Douglas-fir are retained. Infection is more frequent on poor sites with low moisture, and poor fertility than on good sites. Retaining vegetative litter and woody debris helps to control erosion on disturbed sites, provides media for healthy soil fungi, acts as mulch for water retention and conservation of soil nutrients important to tree growth. It is desirable to maintain moderate levels of litter and old and new coarse woody debris (>3" dia.) at ~10-15 tons/acre on the regeneration harvest units. Retention of well distributed forest cover provides protection from high solar insolation and can help reduce drought stress to improve conifer regeneration.

Environmental Effects on Soils & Geology

No Action Alternative: Direct, Indirect, and Cumulative Effects
Implementation of the no-action alternative would result in no soil resource impacts in the project area. Soil resource conditions would remain similar to those described in the existing conditions of this analysis. Geology effects of small areas of shallow slumps are expected to continue to occur associated with tree windthrow or earthquake and the areas affected are generally less than ½ acre and combined up to 4 acres. The timing cannot be predicted.

Action Alternative: Direct and Indirect Effects on Soils
Implementation of the action alternative is a combination of salvage harvest of dead, dying and high-risk trees and regeneration harvest to reduce competition and improve growth of diverse tree species that are more resistant to root rot. Approximately 280 acres of harvest are proposed on locations outlined on Soil Maps S-1. Tree planting, grass seeding roads and noxious weed management would also occur. The proposed project could construct 3.25 miles of road and complete repairs and maintenance on up to 6 miles of road to meet BMP's.

Primary soil concerns with harvest operations are potential for excessive surface disturbance and to a lesser degree, erosion. To maintain soil productivity, and promote conifer regeneration, BMP's and the listed mitigation measures would be implemented to minimize the area and degree of soil effects associated with harvest operations. Implementation of BMP's and the recommended mitigation measures, has been shown to effectively limit detrimental soil impacts to less than 15% of the harvest units based on DNRC soil monitoring on comparable sites (DNRC 2006, 2011). Recent harvest on nearby sites and the estimated area that may be detrimentally impacted is displayed in table S-2.

[illegible]	[illegible]	[illegible]	[illegible] (Acres)
Harvest Units (including landings)	80 acres Cable 200 acres Tractor	Cable up to 8% Tractor up to15%	Cable 6.4 Tractor 30
Roads 3.25 miles	13.2	< 1% of project parcels	Up to 13.2

All new roads are located on stable terrain and would be constructed to meet Best Management Practices. The 3.25 miles of new road construction would change the land use of the added roads to transportation and disturb up to 13.2 acres of land as noted in table S-2. The actual area disturbed varies with road width and extent of temporary roads that would be reclaimed. On existing roads, road maintenance and site specific road reconstruction requirements would be implemented to improve road drainage and control erosion. All new roads would be grass seeded with site adapted grass to speed revegetation and control erosion and weeds.
Most of the areas proposed for harvest are stable, with the exception of small areas of marginal slope stability in the NE corner of the section. The minor area of marginal slope stability would be avoided by roads and protected with site specific mitigations, equipment restrictions and selective harvest. The combined mitigations are expected to have low to moderate risk of direct, indirect or cumulative effects of increased slope instability that would be small in area.

By limiting direct and in-direct effects to15% or less of harvest areas and by protecting at least ~85% of a harvest area in non-detrimental soil impacts, soil properties important to soil productivity would be maintained. Contract administration would monitor on-going operations to control soil disturbance to avoid excessive impacts and meet silvicultural goals to reduce competition. The improved tree spacing would improve growth of retained trees, due to reduced competition for soil moisture and nutrients. For all these reasons, there would be low to moderate risk of low to moderate direct and indirect effects to geology or soil resources as a result of the proposed action.

Nutrient Cycling & Soil Productivity
Considering nutrient cycling, varied tree mortality from insects and disease has already caused many needles and fine litter to fall to the forest floor. A substantial proportion of plant available nutrients are retained in the forest floor duff and surface mineral soils, and forest duff and litter provide a mulching cover that retains surface moisture. A substantial portion of fine foliage that has not already fallen would be expected to break off during logging operations. The proposed harvest and slash treatments is expected to reduce 15 to 20% of the coarse and fine woody debris produced by harvest operations, based on the planned canopy harvest and retaining a proportion of fine materials. On all proposed harvest areas a portion of old and new course woody debris (CWD >3" dia.) at ~5-10 tons/acre and fine litter (similar to historic ranges, Graham et.al. 1994) would be retained, as noted in attached mitigations.

Cumulative Effects of the Action Alternative on Nutrient Cycling and Soil productivity
Cumulative effects to soils can occur from repeated ground skidding entries into the harvest area and additional road construction, depending on the area included. No previous harvest occurred in section 16 except for minor post cutting and road construction in the SE corner of the section, thus there is low potential for low level cumulative effects to soils with the proposed actions

Section 7 Vegetation, Noxious Weeds Issue

Noxious Weeds – There is a concern that forest management activities may result in introduction of new weeds or increased spread of noxious weeds from the proposed forest management activities.

Regulatory Framework

The following plans, rules, and practices have guided this projects planning and/or will be implemented during project activities:
All applicable weed management requirements of the County Weed Control Act 7-22-2101 to 7-22-2153, Best Management Practices, State Forest Land Management rules and regulations, and measures outlined in the DNRC Habitat Conservation Plan would be implemented. This includes, but is not limited to management rules for classified forest lands (ARM 36.11.445)where the department shall use an integrated pest management approach for noxious weed management that includes prevention, education, cultural, biological, and chemical methods as appropriate.

Analysis Methods & Analysis Areas

The methods for disclosing impacts for this analysis include using descriptions of weeds occurring in the area, weed management efforts that have been completed and then qualitatively assess the risk of weed spread based on the proposed actions and mitigations.

Noxious Weeds- Existing Conditions

Noxious weeds occurring in the project parcels are mainly a combination of knapweed (Centaurea maculosa), and houndstongue (Cynoglossum officinale L) . Knapweed was found along roadsides as well as in some forested portions of the project area. Houndstongue was found mostly along roadsides along the access haul routes within the project and on adjacent lands. Road use, grazing, and timber harvest activities are most likely the reasons for the existing rate of spread of noxious weeds and the potential future spread and introduction of noxious weeds. The prevailing winds also carry windblown weed seed throughout this area. Moist sites with well established surface vegetation provide a competitive advantage over noxious weed establishment. Weed management treatments on adjacent ownerships in the area varies from no-action to combinations of revegetation, herbicide treatments and bio-control measures.

Environmental Effects on Noxious Weeds

No-Action Alternative: Direct, Indirect, and Cumulative Effects on Noxious Weeds
With no action, noxious weeds will continue to spread along roads and may increase on the drier site habitats. Limited weed control efforts on access roads across multiple ownerships in the area, increases the potential for windblown seed. Following disturbance events such as fires, or grazing, the establishment and spread of noxious weeds can be more prevalent than in undisturbed areas.

DNRC would continue to treat selected sites on DNRC roads based on priorities and funding availability, but the levels of weed control treatments would be lower than with the action alternative. If new weed invader species are found they would have highest priority for management. On state land parcels the grazing licensees would be required to continue weed control efforts consistent with their use.

Cumulative effects of noxious weeds within the project areas are moderate. Weeds have spread across ownerships over time by multiple uses from wind, fire, traffic, forest management, wildlife and grazing animals. As tree density and ground cover vegetation increase over time, weeds are reduced through vegetative competition.

Action Alternative: Direct, Indirect, and Cumulative Effects on Noxious Weeds
Implementation of the action alternative would involve ground-disturbing activities that have the potential to introduce or spread noxious weeds in susceptible habitat types. For the action alternative, an Integrated Weed Management (IWM) approach was considered for treatment of existing and prevention of potential noxious weeds. For this project: prevention, revegetation of new roads and weed control measures on existing roads are considered the most effective weed management treatments. Prevention measures would require clean off-road equipment. Roadsides would be sprayed prior to operations and weed control and revegetation would slow

noxious weed spread and reduce weed density and occurrence compared to no-action. There would be a similar or potential slight increase in weed infestation within harvest units due to soil disturbance and reduction of tree canopy. The silvicultural prescriptions are designed to control disturbance and scarification to goals need for sustained forest growth. Noxious weeds control efforts would promote rapid revegetation and emphasize treatment of any new noxious weeds found.
Herbicide application would be completed on segments of DNRC roads along the haul route, to reduce weed spread along roads and promote desired vegetation for weed competition and to reduce sedimentation. Herbicide would be applied according to labeled directions, laws and rules, and would be applied with adequate buffers to prevent herbicide runoff to surface water resources. Implementation of IWM measures listed in the mitigations are expected to reduce existing weeds, limit the possible spread of weeds, and improve current conditions, to promote existing native vegetation. Existing weeds would be expected to have a low to moderate increase. More weed control would occur compared to the no-action alternative and grass and competitive vegetation would increase along roads.

Overall cumulative effects of increased noxious weeds within the project area, are expected to be moderate, based on herbicide treatments of existing weeds along roads and implementing prevention measures to reduce new weeds, by cleaning equipment and planting grass on roads to compete against weeds. The combined efforts of weed control across ownerships continue to improve through cooperative efforts with the Powell County Weed District and local weed control interest groups including the Blackfoot Challenge.

Soils and Noxious Weed Mitigations

The analysis and levels of effects to Soil resources with the Action Alternative are based on implementation of the following mitigation measures.

* DNRC would implement all applicable BMP's, Montana Administrative Rules for Forest Management, and reasonable mitigation and erosion control practices during timber harvest, road maintenance, and road construction and road use activities. The commitments of the DNRC Habitat Conservation Plan (HCP) would be implemented on the applicable parcels.

* Limit harvest equipment and hauling operations to periods when soils are relatively dry, (less than 20%), frozen or snow covered to minimize soil compaction and rutting, and maintain drainage features. Check soil moisture conditions prior to equipment start-up.

* On tractor harvest units the logger and sale administrator will agree to a general skidding plan prior to equipment operations to limit trails to 15% or less of the harvest unit. Feller-bunchers may work on slopes up to 45% as long as displacement and turning is minimized to prevent excessive disturbance. Slopes over 45% would be cable harvested to reduce soil impacts and improve harvest efficiency.

* Whole tree skidding can reduce slash hazard, but also remove a portion of nutrients from growing sites. Target fine slash and woody debris levels are to retain 5-15 tons/acre well distributed on site while meeting the requirements of the slash law. On sites with lower basal area, retain large woody debris as feasible since it may not be possible to retain 5 tons/acre and the emphasis would be on providing additional CWD in the future. Slash may be placed on main skid trails to protect soils and reduce erosion potential.

* Existing road segments would be improved and maintained in association with the harvest activities. Road improvements would include surface blading and installation of drainage features to control surface erosion and prevent sediment delivery to streams as needed to comply with BMP'S, and to protect water quality.

* Harvest operations and road conditions would be monitored as part of the on-going project operations and repairs would be made as needed, including erosion control, culvert cleaning and re-vegetation. If cut-slope or fill-slope slumps occurred on new roads they would be stabilized to control erosion as part of the harvest project.

* New road construction, including drainage features should be completed prior to freeze-up. Road cutslopes would be constructed at relatively stable angles as noted in contract.

* New roads would be closed to motor vehicles upon completion of harvest activities and existing road closures would be maintained. Slash would be placed on main skid trails to protect soils and reduce erosion potential and potential unauthorized ATV use as needed.

* Weed & Erosion Control: All road construction and harvest equipment will be cleaned of plant parts, mud and weed seed to prevent the introduction of noxious weeds. Equipment will be subject to inspection by forest officer prior to moving on-site.

* All newly disturbed soils on temporary road cuts and fills will be promptly reseeded to site adapted grasses that include native species to reduce weed encroachment and stabilize roads from erosion.

* DNRC will monitor the project area for noxious weeds as part of on-going timber sale administration. If new noxious weeds occur following the harvest, a control plan will be developed and implemented that may include herbicide treatments. If herbicides are used, application would be done using a licensed applicator in accordance with label directions, State laws, and rules of the Powell County Weed District.

References

Filip, G.M., Goheen, D.J., Johnson, D.W. and Thompson, J.H. 1989. Precommercial thinning in a Ponderosa pine stand affected by Armillaria root disease: 20 years of growth and mortality in central Oregon. Western Journal of Applied Forestry 4: 58-59.

Graham, Russell T.; Harvey, Alan, Jurgensen, Martin; Jain,T.; 1994. Managing Coarse Woody Debris in Forests of the Rocky Mountains. Res. Paper INT-RP-477. Ogden, Utah: U.S.D.A., F.S., Intermountain Research Station, 12p.

MT DNRC 2006, Collins, Jeffry, Compiled Soil Monitoring Report on Timber Harvest Projects 1988-2004., Montana Department of Natural Resources and Conservation, Trust Land Management Division, Forest Management Bureau, Missoula, MT.

MT DNRC , Environmental Assessments of the past DNRC timber sales and roadwork including; Greenough, Washoe, Kamas, McNamera, Ashby & Bear roads and minor salvage permits, Missoula Unit, Southwestern Land Office.

MT DNRC. 2003 Montana Administrative Rules for Forest Management on DNRC Forested Lands. Montana DNRC. Trust Lands Management Division. Helena, MT.

Montana DNRC. 2010, 2012 Multiple reports, Montana Forestry Best Management Practice Audit Reports. Forestry Division. Missoula, MT.

MT DNRC. 2010. DNRC Habitat Conservation Plan, Final EIS Forest Management Bureau Division, Missoula, Montana.

MT DNRC 2011, Schmalenberg, Jeff, Compiled Soil Monitoring Report on Timber Harvest Projects 2007-2011., Montana Department of Natural Resources and Conservation, Trust Land Management Division, Forest Management Bureau, Missoula, MT.

MT DNRC, 2011. Best Management Practices for forestry in Montana. Available online at www.dnrc.mt.gov/forestry/assistance/practices/documents/bmp.pdf; Last accessed August 3, 2012.

NRIS, Montana Natural Resources Information System, Internet database for soils, airphotos, geology, 2013. http://nris.state.mt.us/interactive.html

Sugden, B.D., R. Ethridge, G. Mathieus, P. Heffernan, G. Frank, and G. Sanders. 2012. Montana's forestry best management practices program: 20 years of continuous improvement. J. For. 12-029.